PIT AND QUARRY

JAN 22 1940
PERIODICAL DIVISION

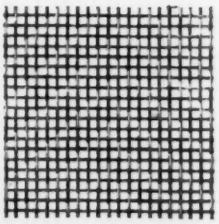
JANUARY, 1940

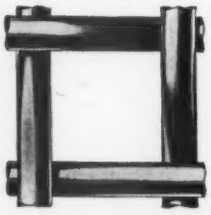
ANNUAL REVIEW OF THE INDUSTRIES

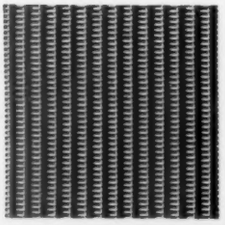
SCREEN AWARDS FOR 1939

TN 1 P65

We are proud to announce that in 1939 the screen-using industries of America and the World awarded us a larger share of their purchases of Industrial Wire Cloth and Woven Wire Screens than in any previous year of our 83 years of business experience. To thousands of faithful old friends, and to hundreds newly entered on our books in 1939, we offer sincerest thanks for many favors, and best wishes for a busy and prosperous New Year.







The LUDLOW-SAYLOR WIRE COMPANY SAINT LOUIS

The background shows "Perfect" Steel Wire Cloth which has been hot-dip galvanized after woven.

Steel wire cloths 8 meshes to the inch or coarser may be galvanized after weaving in long lengths, in widths up to 54 inches. Wider widths may be galvanized after weaving in short lengths. Finer meshes may be woven of wire which has been galvanized before weaving.

EIGHT WAYS TO CUT COSTS
AND PRODUCE A BETTER PRODUCT

Screening to Meet Rigid Specifications

Supplement your rotary screens with Link-Belt vibrating screens to obtain a better grading of the smaller sizes of gravel or stone. Rotary screens for better washing—vibrating screens for better sizing. The combination of both rotary and vibrating assures your ability to meet the most rigid specifications.

Anti-Friction Belt Conveyors

Save power, assure dependability and cut down maintenance costs by replacing your old, plain-bearing belt conveyor idlers with modern Link-Belt anti-friction bearing idlers.

We manufacture all the popular sizes of belt conveyor idlers, for light, medium and heavy-duty service.

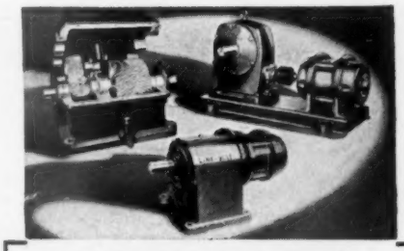
Prolong the Life of Belt Conveyors

Conveyor belts should run practically central with their conveying or supporting idlers to avoid possibility of injury to belt edge in running against chutes, etc. When a belt does run with too much misalignment, the use of Link-Belt self-aligning idlers, spaced at intervals, corrects this condition by automatically "training" the belt to a central position.

● There are many others. Call in a Link-Belt engineer. No inquiry is too large or too small. Send for catalog.

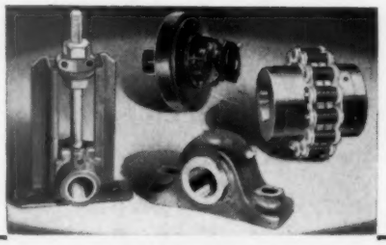
LINK-BELT COMPANY

Chicago Philadelphia Indianapolis
Atlanta San Francisco Toronto
Offices in Principal Cities 7925



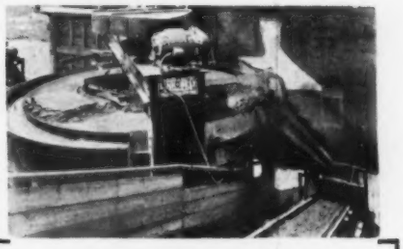
Efficient Speed Reduction

Wherever power is to be transmitted at a reduced or greater speed than that of the motor, there opportunity will be found for the money-saving use of Link-Belt reducers. Link-Belt makes three separate types — Herringbone Gear, Worm Gear and Motorized Helical Gear—as well as Silverstreak Silent and Silverlink Roller Chain Drives and Variable Speed Transmissions — to fit every power transmission need. Send for Catalogs.



Save Power with Link-Belt Transmission Units

A complete line—self-aligning anti-friction ball and roller bearing units, newly designed for greater life . . . unmounted bearings for various industrial applications . . . babbitted bearing units for every service . . . welded steel base plates . . . take-ups . . . friction and jaw clutches, including the famous Twin Disc line . . . cast and cut tooth gears . . . steel split and cast iron pulleys . . . safety collars . . . couplings, both flexible and rigid . . . drop hangers and hanger bearings . . . grease fittings . . . shafting—the latest designs of the leading manufacturers of power transmission equipment. Send for Data Book No. 1600.



Sand Recovery

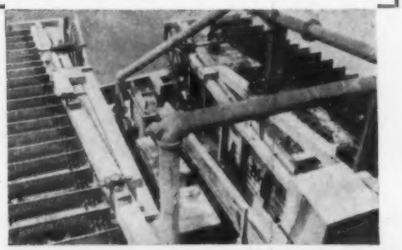
The Rotoscoop is a perfected sand dewatering unit which is capable of recovering fine grains and discharging dry enough for truck transportation, or conveying to and from storage by belt conveyors. It is made in four sizes, 15', 12', 9' and 6' diameters, with capacities varying from 25 to 125 tons per hour.

Screw and Flight Conveyor Units Produce a Drier Sand

The Link-Belt dewatering screw conveyor is a most serviceable and practical unit for small and medium capacities. It produces a clean and dry sand for use where specifications and inspection are rigid. By using two units in series, the coarser sands can be reclaimed for concrete and the fine for plaster.

The Link-Belt dewatering flight conveyor gives equivalent results to the screw conveyor unit with larger capacities.

By using a fine-sand launder, or by arranging two conveyors in series, a coarse and fine sand can be produced.



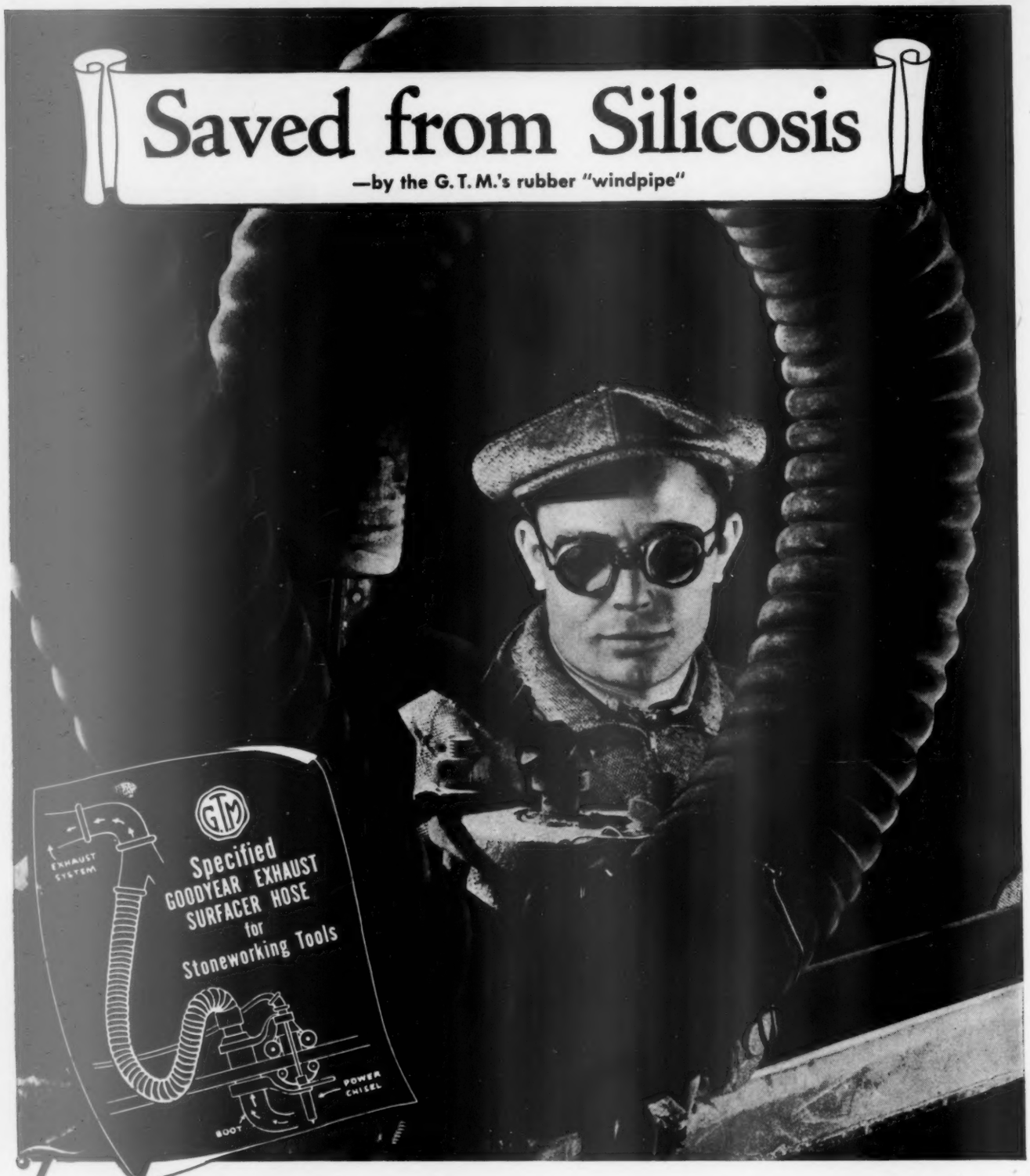
LINK-BELT
· HANDLING ·
PREPARATION
EQUIPMENT

See our exhibit at the Convention of the Nat'l Sand & Gravel Ass'n, Jan. 17 to 19 and Nat'l Crushed Stone Ass'n, Jan. 22 to 24, at St. Louis.

PIT AND QUARRY, January, 1940, Vol. 32, No. 7. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 20 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the act of March 3, 1897.

Saved from Silicosis

—by the G. T. M.'s rubber "windpipe"



The accordion-pleated suction hose attached to this stonecutter's chisel is his safeguard against silicosis—the choking death that comes from inhaling abrasive dust. It acts as an artificial windpipe, swallowing the deadly dust before it endangers his lungs. Flexible, abrasion-resisting, non-kinking, it is specially designed for stonecutting service by the G. T. M. —Goodyear Technical Man. Known as Goodyear Exhaust Surfacer Hose, it is widely used today throughout the granite industry — because it so long outlasts other types of hose equipment used in combating the silicosis peril! Perhaps you could save with rubber correctly designed and applied by the G. T. M. To consult him, write Goodyear, Akron, Ohio, or Los Angeles, California — or phone the nearest Goodyear Mechanical Rubber Goods Distributor.

THE GREATEST NAME IN RUBBER
GOODYEAR

"Here's the Favorite for '40"

• Meet the new Lorain-69—a 1¼-yd. shovel that will dig anything, anywhere, at the drop of a hat. It has a front end, consisting of an all-welded 21 ft. steel boom and 18 ft. stick, that revels in rock and ups operating ranges to a new high for 1¼-yd. machines. It has a stronger, more simplified Center Drive turntable that delivers Diesel power directly for each and every operation in the digging cycle and features such modern improvements as vacuum operation of swing clutches. It's mounted on a heavy, husky, 2-speed Center "Chain" Drive crawler that's a born traveler.

Yes, the Lorain-69 is a great shovel and, being convertible to crane, clamshell, dragline, skimmer or backdigger, it can be used to equal advantage on every type of job. See this modern 1¼-yd. machine "in person" at the Chicago Road Show or write for catalog. It's bound to be the favorite for '40!

THE THEW SHOVEL COMPANY
LORAIN, OHIO

SEE THESE MODERN MACHINES and METHODS AT THE CHICAGO ROAD SHOW JAN. 29–FEB. 2

THEW CENTER DRIVE

NEW 1¼ YD LORAIN 69

EASTON builds for Bigger Payloads

THE EASTON MODEL TR-10 PATENTED SEMI-TRAILER FOR 1940

The Semi-Trailer frame is of heavy, deep-section all-steel construction, with sturdy axle, semi-elliptic springs and permanently coupled fifth wheel. Equipped with Timken bearings.

The body is of the famous patented Phoenix design, a side-dump, doorless container, to be dumped by a fixed hoist at the crusher. It is of heavy steel construction, with a wood-cushioned floor protected by an easily replaceable steel liner plate.

This unit features a stabilizing outrigger, and a transferring hinge which combine to relieve the light tractor chassis from the strain of dumping. Capacity shown—15 tons to 20 tons. Other sizes available.

Write for additional information.

25 YEARS OF LEADERSHIP • ALL TYPES OF CARS, TRUCK BODIES, AND TRAILERS FOR QUARRIES

PHOENIX CAR (Patented)

One of the most popular cars for quarry service ever built by Easton and still a leader in this field. Simplicity of design plus rugged construction provide years of service.

WON WAY CAR (Patented)

Features an automatic down-folding door which forms a chute with the floor when body is tilted for dumping. Dumped to one side by a fixed hoist at the crusher. Write for descriptive literature.

MODEL GS SEMI-TRAILER

An EASTON side-dump trailer with patented automatic down-folding door. Built to meet highway clearance standards. Shown in combination with MACK Model CH Cab-Over-Engine Tractor.

4584
6302 D

Bigger Payloads for 1940

MACK
MODEL EG
TRACTOR

72

Combining a new smaller tractor with a big semi-trailer to give you faster haulage at a much lower cost per ton

These big new Easton Semi-Trailer units have inaugurated the most sweeping advance in the history of quarry haulage. First introduced in 1936, *Easton* Semi-Trailers have advanced rapidly to demand *first consideration* among leading quarry operators. On every installation remarkable savings in cost per ton hauled have been reported . . . often well over 35%. The development of these big units by *Easton* has made possible the application of smaller, more economically-powered tractors to quarry service. Now with the introduction of a sturdy tractor, specially engineered for this purpose by *Mack*, *Easton* presents a combination which results in direct savings, both in operating cost and initial cost. Write for complete information, or ask to see our new natural-color movies of *Easton* Semi-Trailers in action.

THE MACK MODEL EG TRACTOR

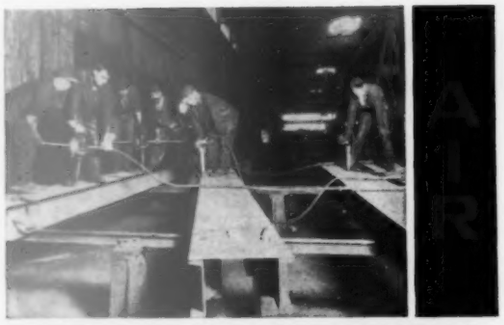
The Mack Manufacturing Co. has engineered this new economically-powered tractor especially for use with Easton Semi-Trailers. Before the advent of Semi-Trailer haulage the abnormal stress of dumping, rather than the amount of load carried, dictated an unusually heavy chassis. Now relieved of dumping strain this small yet sturdy tractor can offer its substantial savings in purchase price and operating cost to the quarry operator. Also available in cab-over-engine models and with either Gasoline or Diesel engine.

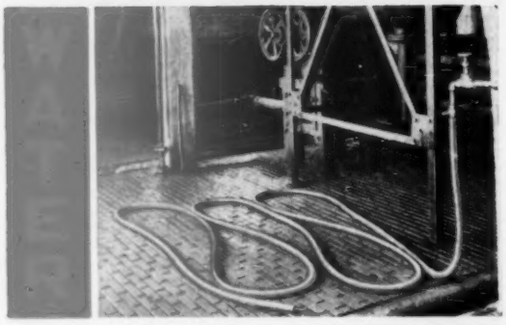
EASTON CAR & CONSTRUCTION COMPANY, EASTON, PA.

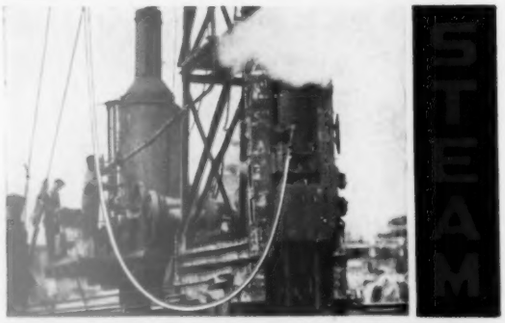
YOU'LL BE WELCOME IN BOOTH 63 AT THE N. C. S. A. CONVENTION

MANHATTAN MAKES HOSE

That Is Self-Selling—Once Used







SELF-SELLING because it is service-giving. And Manhattan makes hose for every service, hose the performance of which outweighs price by making cost, in fluid or material handled, low; by withstanding abrasion, exposure, sudden surges of pressure, fluctuations of temperature and by resisting the action of steam, acids, oil and solvents. . . . 81 kinds of Manhattan Hose for 81 types of service—every one well-made from tough materials for long wear—therefore economical.

You, your purchasing agent, your cost accountant and the men who use Manhattan Hose in your plant will all like it.

Combine satisfaction and economy by ordering Manhattan Hose. Incidentally you may want Bulletin 6867, with its time-saving, illustrated information on hose. A post card will bring it.

Condor PRODUCTS

Conveyor and Elevator Belt
Compensated Belt
Transmission Belt
V-Belt
Air Hose
Contractors Hose
Fire Hose
Hydraulic Hose
Oil & Gasoline Hose
Sand Blast Hose
Steam Hose
Suction Hose
Water Hose
Chute Lining
Launder Lining
Industrial Brake Blocks and Lining
Molded Rubber Goods
Rubber Lined Tanks
Rubber Covered Rolls
Abrasive Wheels
Bowling Balls

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES AND FACTORIES
[illegible] Townsend St., Passaic, N. J.

it's for you mr. Operator—

a new MULTI-STAGE FINE REDUCTION CRUSHER

- ★ MULTI-STAGE BELL HEAD AND CURVED CONCAVES
- ★ QUICK AND EASY ADJUSTMENT
- ★ SHOCK ABSORBER SUSPENSION
- ★ ABSOLUTE DUST PROTECTION
- ★ AUTOMATIC LUBRICATION
- ★ ROLLER-BEARING COUNTER-SHAFT

TRAYLOR-STEARNS PATENTS

CRUSHES FINER AT GREATER CAPACITY WITH LESS POWER

PRODUCT IS CUBICAL-NO SLABS, MINIMUM OVERSIZE

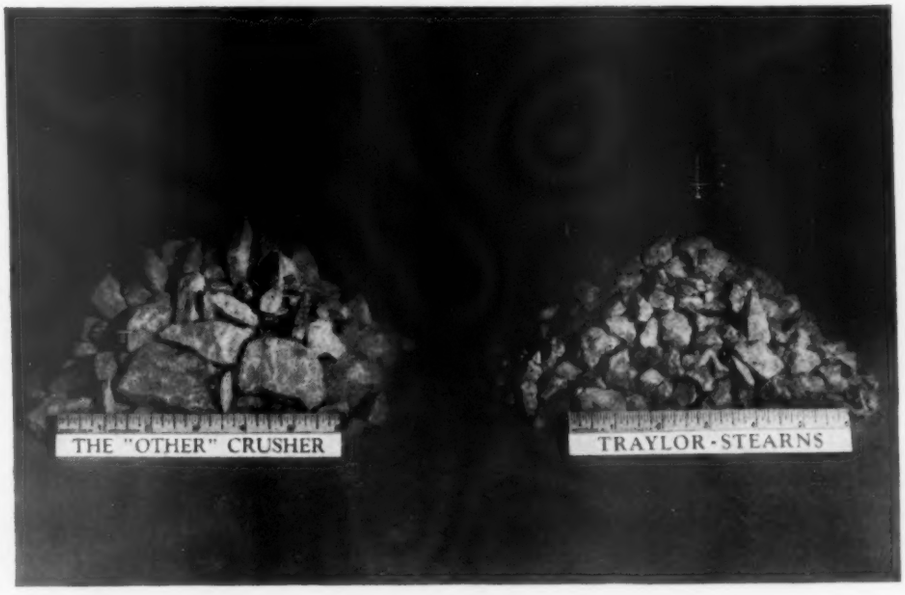
POSITIVELY NON-CHOKABLE

WRITE FOR BULLETIN 113

SEE IT AT THE ST. LOUIS EXPOSITIONS, JAN. 17-19 & 22-24, 1940

PROOF POSITIVE!

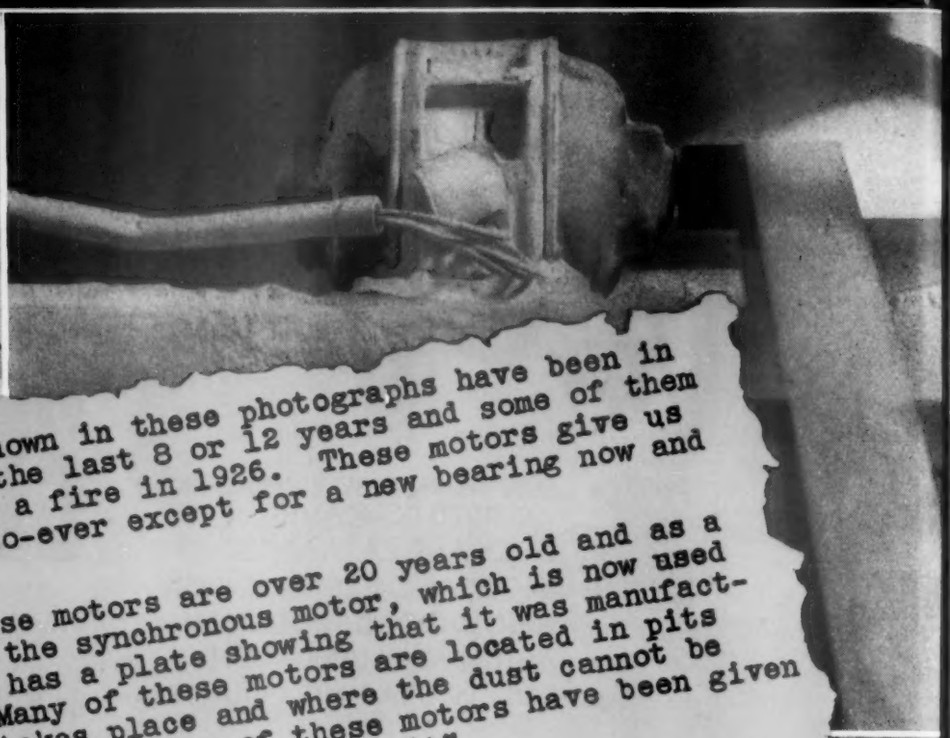
The photo shows two samples of crushed trap rock, taken WITHOUT SELECTION from outflowing streams of finished output. To the left is the product of a 4'0" reduction crusher, (not a Traylor), extensively used, and at right that of a 3'0" TRAYLOR-STEARNS MULTI-STAGE FINE REDUCTION CRUSHER. Both crushers had a feed of THRU 1⅞" ON ⅞", a very slabby product of a secondary crusher. Both crushers were set to 5/16" closed side of discharge. The TRAYLOR-STEARNS had an output of 60 tons per hour and the "other" crusher 45 tons per hour. The TRAYLOR-STEARNS product contained 42.2% THRU ⅜", square holes, while the "other" crusher product contained 24.3% THRU ⅜", square holes. The TRAYLOR-STEARNS used one H.P. per ton of product and the "other" crusher one and one-third H.P. per ton of product.



TRAYLOR ENGINEERING & MANUFACTURING CO.

ALLENTOWN, PENNA. U.S.A.

Marble Dust! Fire! Time!

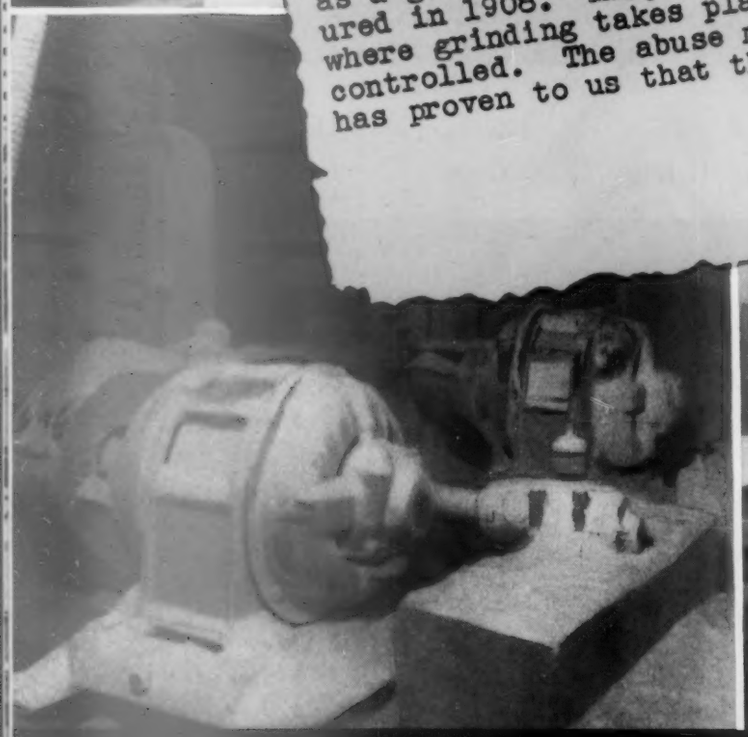


The motors shown in these photographs have been in constant use for the last 8 or 12 years and some of them went even through a fire in 1926. These motors give us no trouble what-so-ever except for a new bearing now and then.

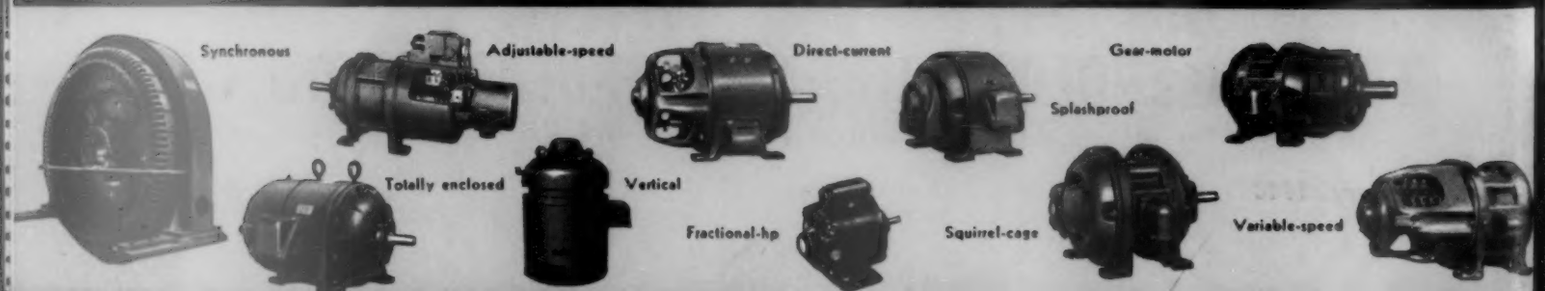
Some of these motors are over 20 years old and as a matter of fact, the synchronous motor, which is now used as a generator, has a plate showing that it was manufactured in 1908. Many of these motors are located in pits where grinding takes place and where the dust cannot be controlled. The abuse many of these motors have been given has proven to us that they can "take it"

UNIVERSAL MARBLE PRODUCTS CORP.

By Frank F. Palmson
Executive Director



THERE'S A G-E MOTOR TO FIT ANY JOB



-Test G-E MOTORS

At Universal Marble Products Corp.

Read What Mr. Palmison Says About How They Passed These Tests

THE statement on the opposite page from Mr. Palmison, Executive Director of the Universal Marble Products Corp. at Thornwood, N. Y., tells how G-E motors have been tested by marble dust, fire, and time. In spite of these severe conditions, the G-E motors have cost practically nothing for upkeep.

The dust alone is a severe test of motor insulation. Powdered dolomite and marble dust, products of this plant, are very abrasive. Totally enclosed motors would usually be recommended for such locations.

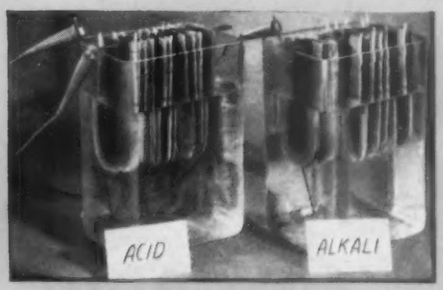
Open G-E motors, however, have not only stood up under the dust, but have passed through a fire, and have already turned in long operating records. They have, as Mr. Palmison says, given "no trouble whatsoever except for a new bearing now and then."

Why Is Such Performance Possible?

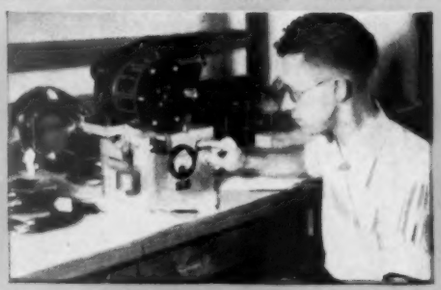
One reason G-E motors pass performance tests like this is the thorough testing at every point in their manufacture. Designs, materials, and the motors—both finished and in process—are all continually checked by numerous tests such as those shown below.

G-E motors are available in all sizes and types. When you need information on any type, call the nearest office of General Electric, the G-E Supply Corp., or G-E motor dealer. General Electric, Schenectady, New York.

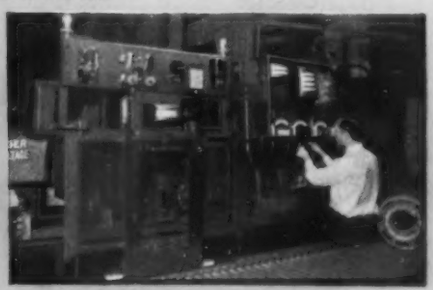
TYPICAL FACTORY TESTS ON G-E MOTORS



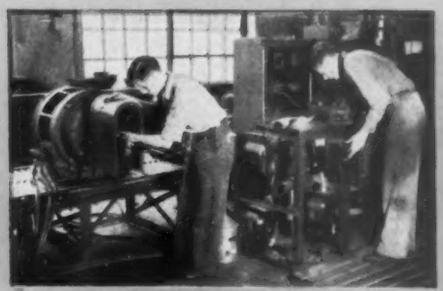
Acid and alkali tests prove that General Electric insulating varnish protects motor windings against mild corrosive agents



Abrasion test. This machine tests the resistance to abrasion of the enamel film on magnet wire used in G-E motors

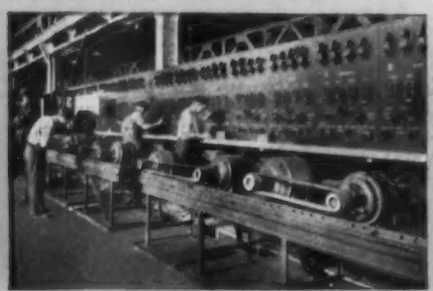


High-potential test No. 1 checks the stator windings of G-E motors before they are dipped in the insulating varnish



A complete electrical test is made on all motors before they leave production, even though they have already passed many tests

High-potential test No. 2 is likewise made on each motor to prove the dielectric strength of the insulation



Punishing life tests on representative G-E motors include service more severe than any conditions motors normally meet

GENERAL ELECTRIC

What! Steel Cheaper than Wood ?

YOU may be one of the many who think of timber as the cheapest material for building belt conveyor frames, and it was not so long ago that this was true. But now—it is hard to find a conveyor installation that would not be cheaper with the new Barber-Greene Standardized Conveyor Truss.

The B-G Truss is Pre-Engineered. You get the truss to support a given load for a given span or overhang.

It is shipped from stock—no costly delays.

It can be erected in a fraction of the time required for building a timber truss—and with less expensive labor.

Since much longer spans are possible, fewer bents are needed, not only saving the cost—but avoiding unnecessary ground obstructions.

The upkeep of a B-G Standardized Steel Truss Conveyor is much less than a wood frame. There is no sagging, rotting, or warping, and no fire hazard.

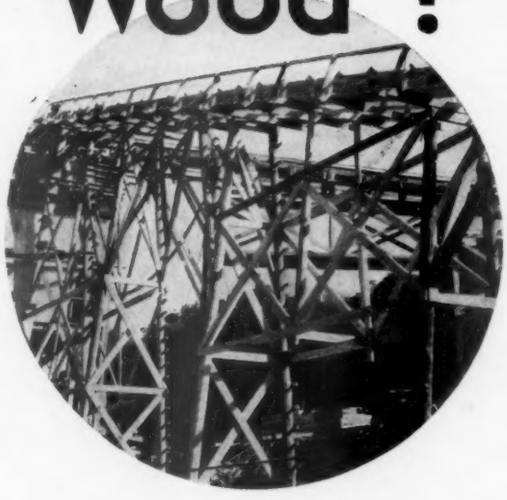
The belt life is greatly prolonged because the B-G steel frame is correctly aligned and retains this alignment.

All the idlers may be easily reached for lubrication and alignment. This is particularly important on the return belt idlers, which are very inaccessible in most timber frame construction.

The decking in timber conveyors is usually flat, allowing the material to build up and stop the idlers. Curved (self-shedding) decking is furnished with the B-G Truss.

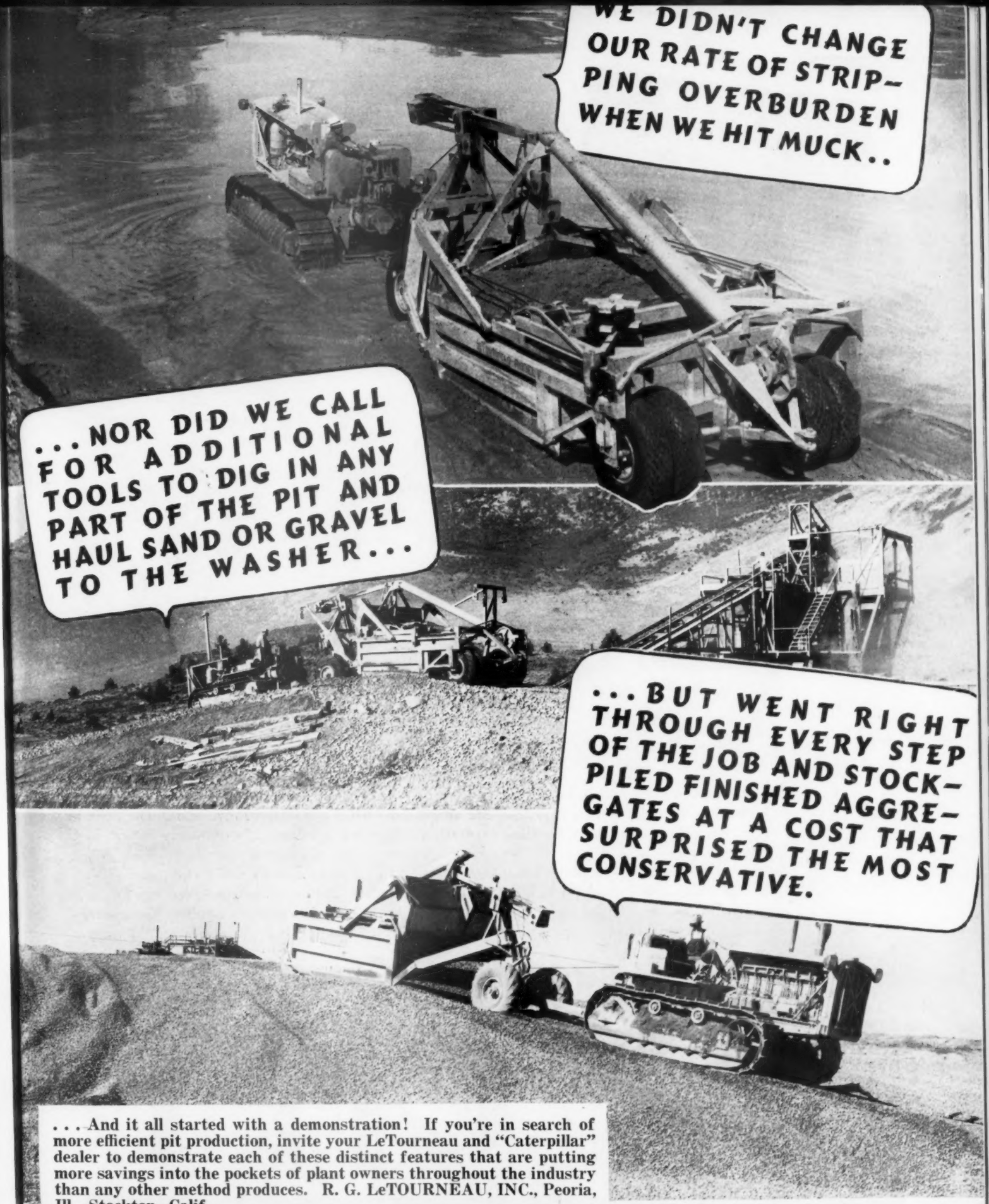
Your Barber-Greene can never be made obsolete in your material handling system. It can be lengthened, shortened, or otherwise altered to meet changing conditions, or new set-ups. It is built to take all standard B-G conveyor parts and accessories. For the same reason, there is always a high resale value on Barber-Greenes—much greater than the small salvage value of a timber from conveyor.

A B-G representative will gladly call to discuss YOUR material handling problems. There is no obligation.



BARBER-GREENE COMPANY

492 West Park Ave. Aurora, Ill.


WE DIDN'T CHANGE OUR RATE OF STRIP-PING OVERBURDEN WHEN WE HIT MUCK..
...NOR DID WE CALL FOR ADDITIONAL TOOLS TO DIG IN ANY PART OF THE PIT AND HAUL SAND OR GRAVEL TO THE WASHER...
...BUT WENT RIGHT THROUGH EVERY STEP OF THE JOB AND STOCK-PILED FINISHED AGGRE-GATES AT A COST THAT SURPRISED THE MOST CONSERVATIVE.

. . . And it all started with a demonstration! If you're in search of more efficient pit production, invite your LeTourneau and "Caterpillar" dealer to demonstrate each of these distinct features that are putting more savings into the pockets of plant owners throughout the industry than any other method produces. R. G. LeTOURNEAU, INC., Peoria, Ill., Stockton, Calif.

LETOURNEAU

STRIPPING EQUIPMENT

Carryall * Scrapers, Angledozers,* Bulldozers, Rooters,* Power Control Units, Drag Scrapers, Pushdozers, Sheep's Foot Rollers, Cranes, Tree-dozers.

* Name Reg. U. S. Pat. Off

B. R. ACKER CO., Inc., * TAKOMA PARK, MD., CONTRACTOR SAYS:

"We are so well satisfied with our Model 42 Shovels we feel . . . other contractors should know the merits of your equipment. On 60,000 yard Susquehanna River Bridge project, Shovel #3 averaged 126 yds. per hour. This is really bailing dirt with a ¾ yard rig."

PURCHASED 3 BAY CITY SHOVELS IN 1939

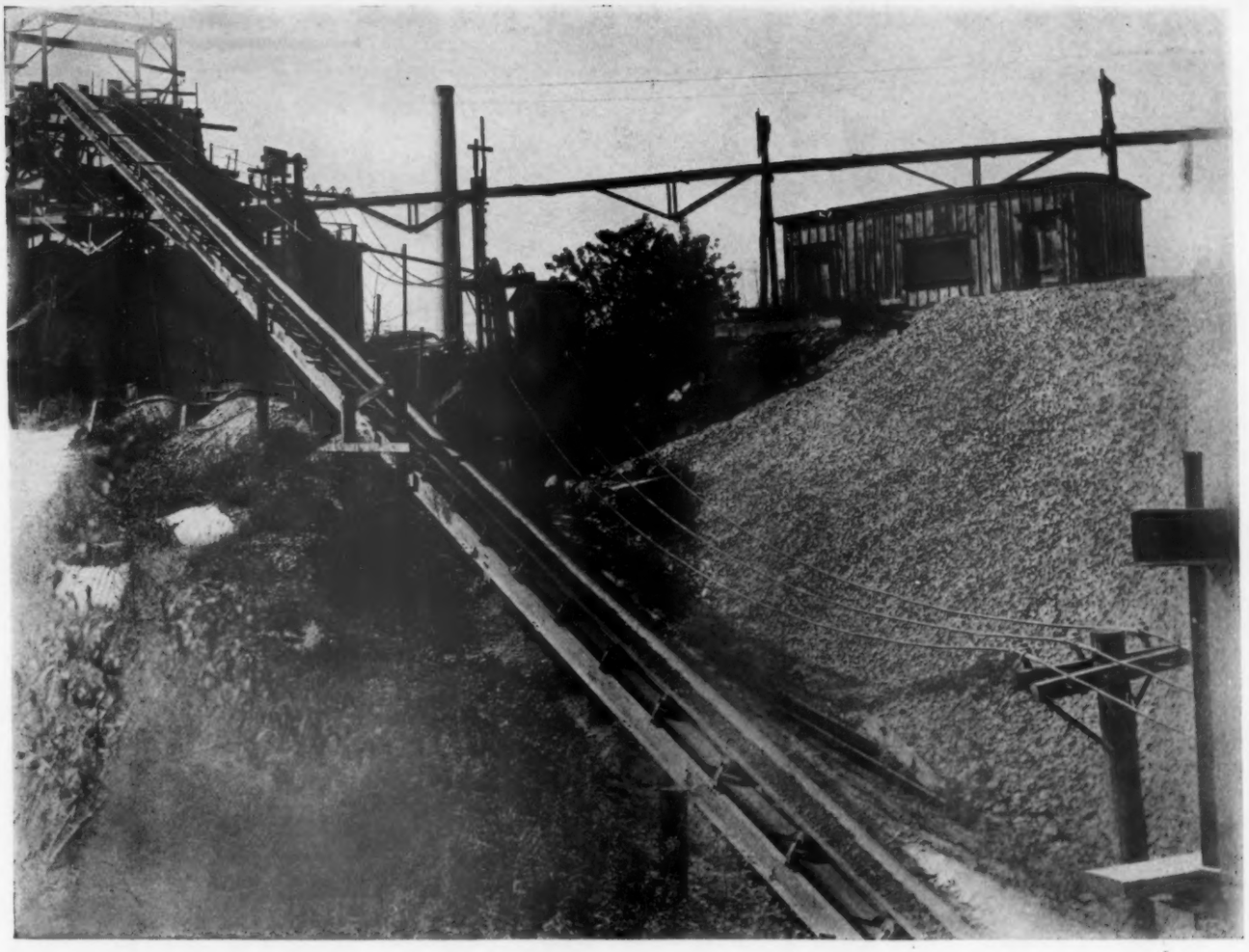
A BAY CITY will give you *Bigger Performance at Lower Cost!*

NO matter what kind of work you are figuring, the *low cost* performance of BAY CITY convertible shovels, cranes, draglines and trench-hoes will return bigger dividends. The experience of more than 25 years of building excavating equipment is reflected in the many outstanding refinements which will quickly be appreciated by the practical construction man. Back of all these improvements are the many advantages of BAY CITY design—BAY CITY endurance—BAY CITY dependability and BAY CITY economy which combine to provide power, speed and easy operation with low maintenance and operating cost. For the complete story about these money-making direct movers ask for a copy of our 32-page illustrated Catalog H-3. No obligation, of course.

BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN

BAY CITY

SHOVELS · CRANES · DRAGLINES · TRENCH-HOES · SKIMMERS



CONVEYING tons and tons of GRAVEL

All day long . . . day in and day out, gravel from this huge pile is being raised to the storage bins by a Quaker Conveyor Belt.

Here is a condition where you really do need a stamina-built belt . . . where an incline of such unusual severity exists.

To do work of this character a belt must have stamina . . . it must have that something which will permit a large tonnage to be conveyed . . . it must give results . . . and a QUAKER Rubber Belt *does* give results.

Because stamina and vigor are built into every belt. From the selection of duck, woven to our own specifications . . . the compounding of the rubber . . . the long-tooth friction . . . the hair-line accuracy in pressure and temperature control during vulcanization . . . rigid inspection throughout entire manufacture . . . and you have in Quaker a finished quality belt that gives you real tonnage.

Let us estimate on your next belt. Quaker's experienced belt engineers are always at your service. Call on them on any belt problems.

QUAKER CITY RUBBER COMPANY

OVER 50 YEARS OF CONSISTENT QUALITY

PHILADELPHIA · ***NEW YORK*** · ***CHICAGO*** · ***HOUSTON*** · ***SAN FRANCISCO***

"NITRAMON"
The *safer* blasting agent. High shattering action produces good fragmentation—reduces secondary shooting. Non-freezing. Water-proof. Easy to load. As economical as it is efficient.

• • •

"NITRAMON" PRIMER
The safest and best means of detonating "NITRAMON."

DU PONT
REG. U. S. PAT. OFF.

EXPLOSIVES *and*

OF QUARRY SHOT PRODUCTS

Give lowest cost per ton of rock moved

DU PONT has been manufacturing explosives and blasting agents for 138 years. Today, du Pont offers you products that show the results of this long experience. There is a du Pont product made for every particular kind of quarry job . . . *and proved by performances* . . . to give you maximum efficiency at minimum cost.

In addition, du Pont has available whatever technical assistance you may need on any blasting problem . . . to help assure your getting the lowest cost per ton of rock moved.

E. I. DU PONT DE NEMOURS & CO. (INC.)
Explosives Department • Wilmington, Delaware

GELEX NOS. 1 & 2

High velocity, good loading density and water resistance make it very effective for bottom loads. Gives excellent fragmentation.

DU PONT EXTRA

For economical, efficient blasting. Recommended for top loads, and in bore holes where water is not a factor.

RED CROSS FREE RUNNING POWDER

For use in rough holes, for sprung holes, and for top loads. Made in varying strengths and bag-packed for ease in loading. Not recommended in wet work.

BLASTING ACCESSORIES

CONSTANT GAUGE HOLES

And why Timken Bits drill them . .

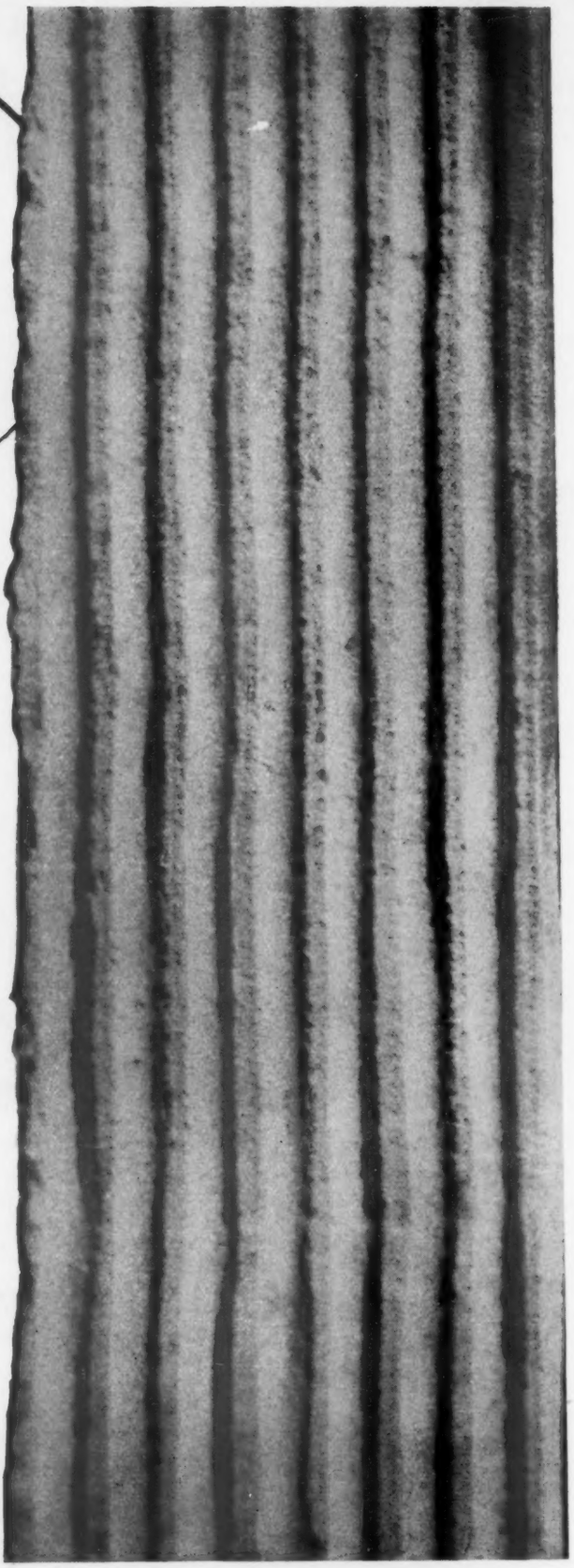
"Constant gauge holes" through the use of TIMKEN Rock Bits is the answer to every dimensional stone quarry operator's prayer. For constant gauge holes greatly facilitate subsequent broaching operations and moreover result in minimum loss of material through even fracture.

Here's why TIMKEN Removable Rock Bits can drill constant gauge holes *economically*. When the bit begins to get dull—it is removed and a sharp bit of identical gauge is attached to the same steel. Thus, it is necessary to carry only a small steel inventory whereas in the case of forged steel bits the inventory necessary to obtain constant gauge holes is prohibitive.

If you are in the dimensional quarry business and are not drilling constant gauge holes, why not let us demonstrate what TIMKEN Bits will do? Write us immediately. No charge, of course.

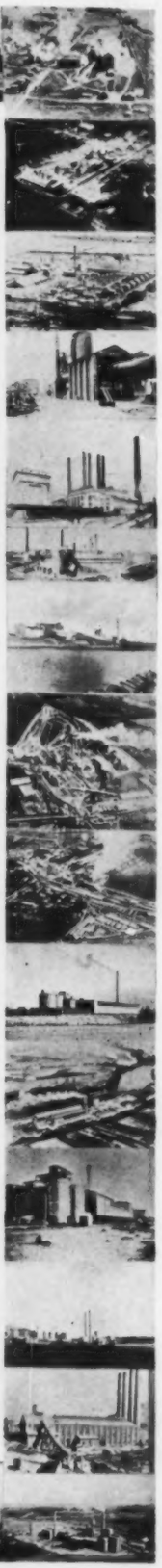
TIMKEN
ROCK BITS

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.



Sample of cores left by drilling constant gauge holes with TIMKEN Bits. Note cores same size from top to bottom thus facilitating broaching.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO



SMIDTH MACHINERY

FOR

CEMENT • LIME • ORE

The illustrations show some of the installations of Smidth machinery in various countries. Space does not permit showing all. However, Smidth machinery has been supplied to

64 COUNTRIES OF THE WORLD

250
UNAX ROTARY KILNS
have been installed throughout the world

650
UNIDAN MILLS
have been installed throughout the world

In addition to rotary kilns and Unidan Mills, Smidth equipment includes a complete line of machinery, such as ballmills, tubemills, coolers, agitators, washmills, pumps, conveyors, packers, separators, etc., with accessories, for use in Cement, Lime and Ore plants.

F. L. SMIDTH & CO.

225 BROADWAY — Engineers — NEW YORK, N. Y.

The BOWL MILL offers Complete Firing Control

CONTROL BOARD FOR BOWL MILL

The Raymond Bowl Mill gives precision control over grinding and firing, and assures proper preparation of the coal for maximum combustion efficiency in the kiln.

The electric control board . . . which is an integral part of the Bowl Mill . . . puts every function of the machine at the instant command of the operator *from one station.*

This instrument panel includes: Draft Gauge . . . Inlet and Exit Temperature Recorder . . . Mill Power Ammeter . . . . Watt Hour Meter . . . Feeder Revolution Counter . . . Feed Rate Indicator . . . and Starter Push Buttons with Pilot Lights.

With this operating control, go many other features, including ease of adjustment while running . . . exceptional availability and dependability . . . quiet, vibrationless operation . . . uniformity of grind . . . low power and lubricating costs.

These advantages result in the sustained leadership of the Raymond Bowl Mill, year after year, insuring record economy in coal preparation and kiln firing.

Check up on your plant for 1940, and equip for greater profits.

Write for BOWL MILL Catalog

RAYMOND PULVERIZER DIVISION

COMBUSTION ENGINEERING COMPANY, INC.

1321 North Branch Street **CHICAGO**

Sales Offices in Principal Cities • • • In Canada: Combustion Engineering Corporation, Ltd., Montreal

CRUSHERS

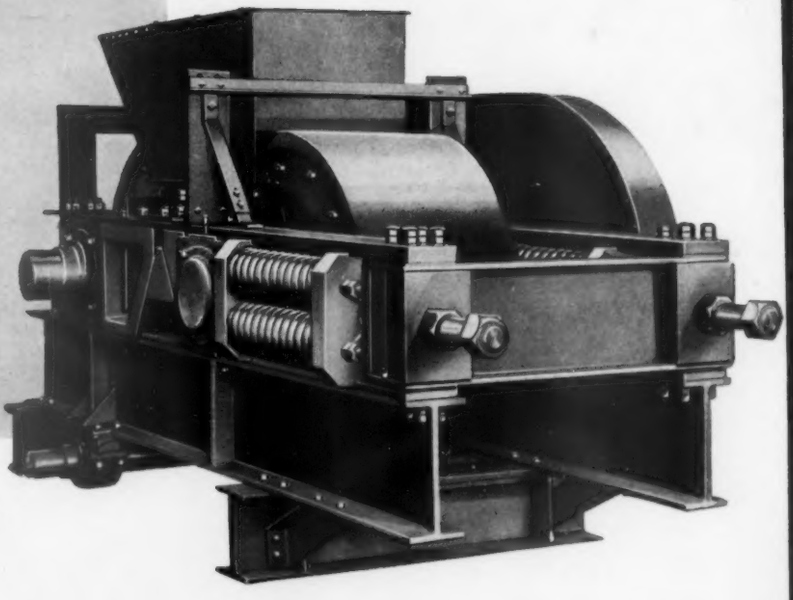
JAW CRUSHER

For quarry or gravel pit.
For primary or secondary crushing.
Sizes from 9"x16" up to 24"x36".
SKF Anti-friction bearings for long life and economy,
Or Bronze bearings for low investment.
Overhead eccentric for force feed action and capacity.
Steel base and pitman for strength and light weight.

For complete information and details ask for this booklet No. 527.

ROLL CRUSHER

For secondary crushing.
For producing small materials.
For increasing production.
Sizes from 16"x16" to 54"x 24".
All gear drives for continuous operation.
Manganese shells for long wear.
Spring release for safety.



For complete information ask for this booklet No. 530

PIONEER ENGINEERING WORKS

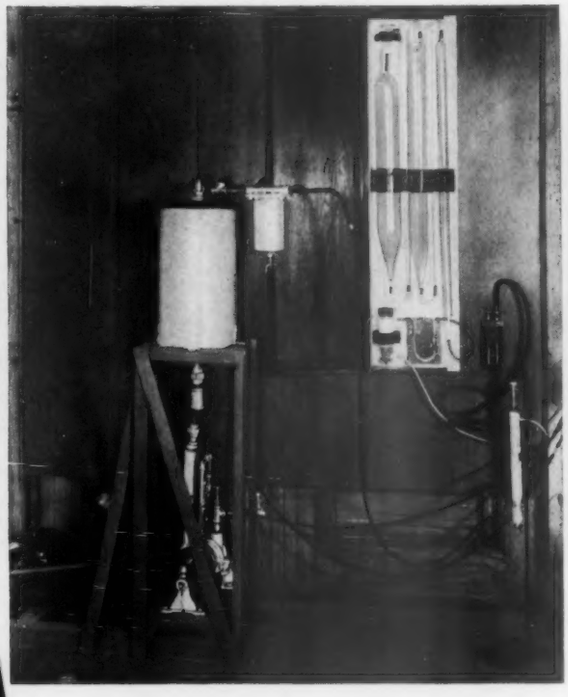
1515 CENTRAL AVENUE MINNEAPOLIS, MINNESOTA

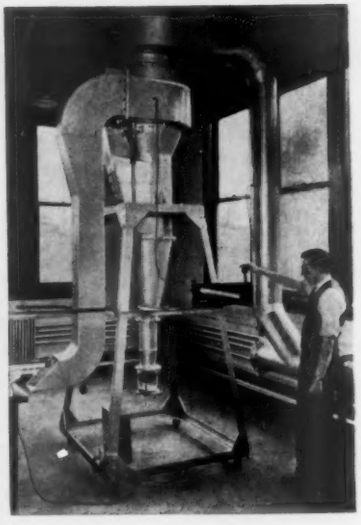
THE BUELL TESTING LABORATORY

Predetermines and Guarantees

your DUST COLLECTION efficiency

Making dust size analysis by sedimentation test.





Making test of cement dust with experimental cyclone.

INVESTIGATE BUELL AND $AVE MONEY!

BUELL'S AIR ELUTRIATOR

The only apparatus of its kind in the United States. It separates simultaneously into four fractions dusts too fine to be graded by sieves.

Buell does not sell dust collection equipment by rule of thumb. *Overall dust collection efficiency depends primarily on the size and specific gravity of the dust.*

The Buell Testing Laboratory engineers each job to meet a specific requirement, predetermines and guarantees its efficiency in advance of installation.

Buell's Testing Laboratory is equipped for complete size analysis determination even of dusts that will pass through the finest commercial screens. Buell is, therefore, fully prepared to determine and develop the proper type of equipment to give the most satisfactory answer to your specific dust problem.

We invite you to bring your dust problems to our laboratory. If our engineers find that Buell equipment cannot solve them, we will frankly tell you so.

Buell has the only Cyclones with a Dust Pocket

DUST COLLECTION and FLY ASH CONTROL—two informative booklets free on request.

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DUST COLLECTORS

BUELL ENGINEERING COMPANY, INC.
SUITE 5000, 12 CEDAR STREET, NEW YORK

Wherever located, you will be quickly served through sales offices of either BUELL ENGINEERING CO., or B. F. STURTEVANT CO.

★ IN 1940 ★

TO PROTECT YOUR PROFITS IN ROCK REDUCTION

"SEE AMERICAN CRUSHERS FIRST"

Travel where you will in these "48 States" during 1940 or any other year, you won't find the equal of AMERICAN Crushers for vigilance and effectiveness in safeguarding their employers' interests.

AMERICAN equipment, backed by more than 30 years' experience in designing and manufacturing reduction machinery, is a "first choice" in the aggregates industry. The best-informed operators recognize AMERICAN Crushers as their main defense against uprising costs.

The supremacy of AMERICAN Hammermills and Ringmills is due to their outstanding record for long CONTINUOUS working life, low power and upkeep, and uniformity of product.

Their simplicity and sturdiness are a guarantee of steady service without troublesome, costly delays. Highest quality parts assure satisfaction in performance.

AMERICAN Crushers are known from coast to coast for their ability to conserve profits on all reduction operations.

Write for Catalog

AMERICAN PULVERIZER CO.

1283 MACKLIND AVE.
ST. LOUIS, MISSOURI

Modern Aggregate Plants . . . by TELSMITH

Like hundreds of Telsmith plants all over the world, these new rock crushing and gravel washing plants have operated smoothly, efficiently and profitably right from the start. A Telsmith plant means the latest in equipment—crushers to bin gates—Telsmith-designed-and-built for extra staying power, greater flexibility and capacity, lower operating and upkeep costs. And Telsmith *Balanced* Engineering Service and centralized responsibility fits that plant to your own particular needs.

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Pontiac Stone Co.
Pontiac, Ill.

Crystal Concrete Products Co.
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Arundel Corporation, Woodberry
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Richmond Sand
& Gravel Co.
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Company
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Highspire
Sand & Gravel Co.
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Kelly Run Stone Co.
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SMITH ENGINEERING WORKS, 504 EAST CAPITOL DRIVE, MILWAUKEE, WISCONSIN

50 Church Street, New York City — 111 W. Wacker Drive, Chicago, Ill. — 713 Commercial Trust Bldg., Philadelphia, Pa. — 81 Bleecy St., Cambridge, Mass. — 412 Westinghouse Bldg., Pittsburgh, Pa. — 7016 Euclid Ave., Cleveland, Ohio

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AIRVEYOR CONVEYING SYSTEM
(PNEUMATIC)

FULLER-KINYON REMOTE-CONTROL UNLOADER

FULLER-KINYON CONVEYING SYSTEM
(STATIONARY TYPE)

FULLER

serves the

CEMENT INDUSTRY

Many years of contact with the cement industry has resulted in the development of equipment peculiar to that field . . . much of this equipment now being considered as standard. The possibilities of savings warrants investigation of this equipment for the betterment of your plant.

FULLER-KINYON
CONVEYING SYSTEMS

FULLER AIR-QUENCHING COOLERS

FULLER ROTARY COMPRESSORS
AND VACUUM PUMPS

AIRVEYOR CONVEYING SYSTEM

FLUXO CONVEYING SYSTEM

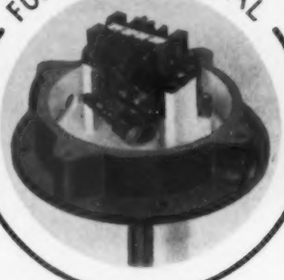
ROTARY DISCHARGE GATES

ROTARY FEEDERS

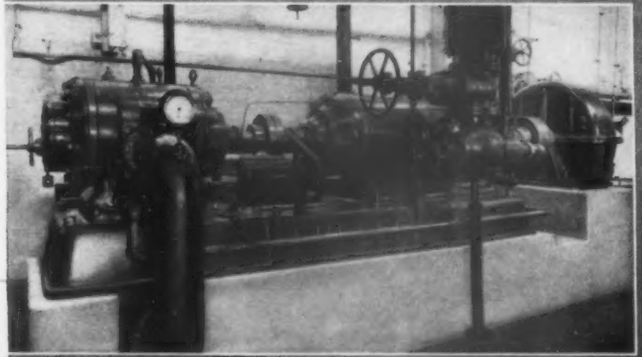
BIN SIGNALS

FULLER ROTARY FEEDER

FULLER BIN SIGNAL



ROTARY COMPRESSORS AND VACUUM PUMPS



FULLER AIR-QUENCHING COOLER

FULLER COMPANY - CATASAUQUA, PA.

CHICAGO—Marquette Bldg. SAN FRANCISCO—Chancery Bldg. G17

MORE power TO YOU

With the entire load in direct contact with the powerful Primacord-Bickford Detonating Fuse, every cartridge in the hole "goes" with the full force of a primer cartridge. And while the explosive wave of Primacord is practically instantaneous—over three miles a second—the fraction of time delay between holes and between rows of holes allows proper relief of burden. Better results are afforded with a minimum quantity of explosives, and savings are effected in loading, connecting holes, and removing the well-broken-up material.

PRIMACORD·BICKFORD

Detonating FUSE

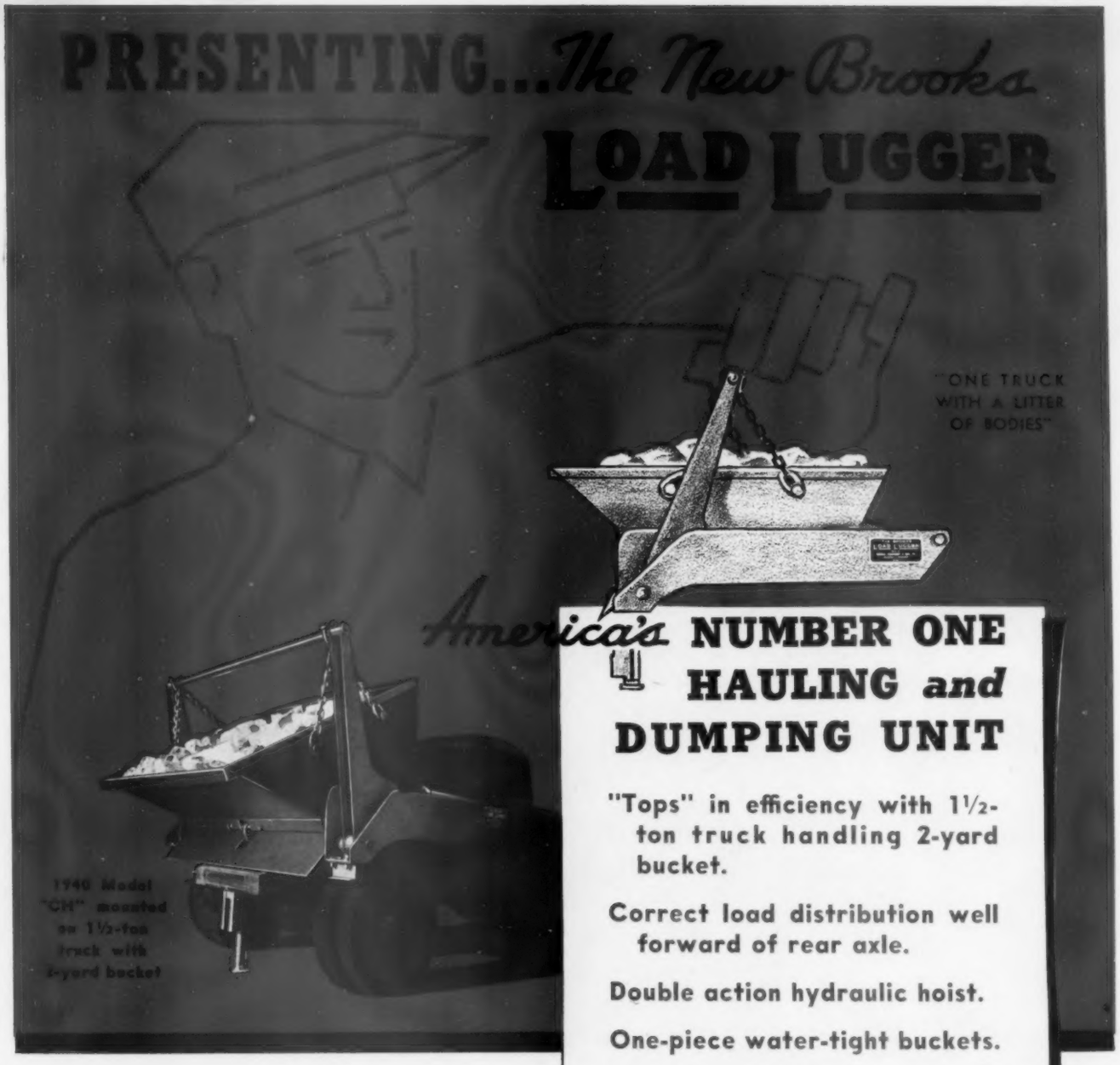
THE ENSIGN-BICKFORD CO., Simsbury, Conn.

Makers of Cordeau-Bickford Detonating Fuse—and Safety Fuse since 1836

PB16

1. Tie through cartridge.
2. Half hitch branch to main line.
3. Connect main line lengths with square knot.
4. Fuse and cap on end of main line.

PRESENTING...The New Brooks LOAD LUGGER



America's NUMBER ONE HAULING and DUMPING UNIT

"Tops" in efficiency with 1½-ton truck handling 2-yard bucket.

Correct load distribution well forward of rear axle.

Double action hydraulic hoist.

One-piece water-tight buckets.

"Trigger-fast" control from driver's cab.

Send for folder and read how Load Lugger with a set of buckets will replace several trucks and save 50% or more on the job.

LOAD LUGGER goes streamlined . . . in form and function . . . the sensation of 1940 in dump-truck equipment.

This latest Model "CH" combines all the advantages of the former design plus new features, developed by experience during Load Lugger's long record of success.

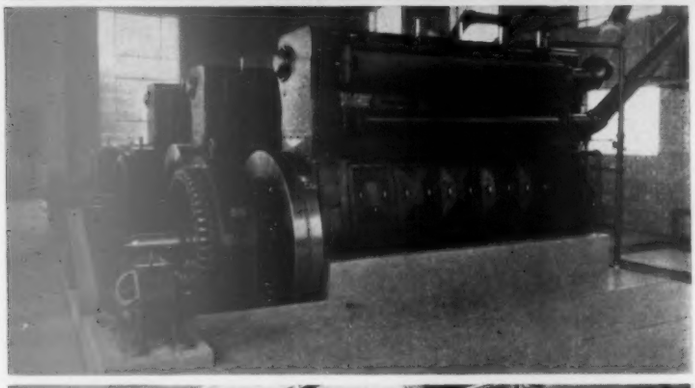
It is faster in action . . . easier in control . . . broader in use . . . and sturdier in construction. Wherever loading is done by hand, the use of Load Lugger is truly a cost-cutter that will boost your profits on every job.

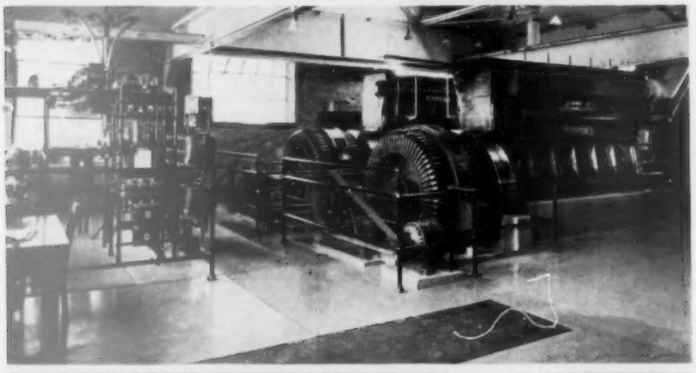
It is so entirely different, so radically advanced, that we just published a descriptive Bulletin giving full details . . . *send for your copy today.*

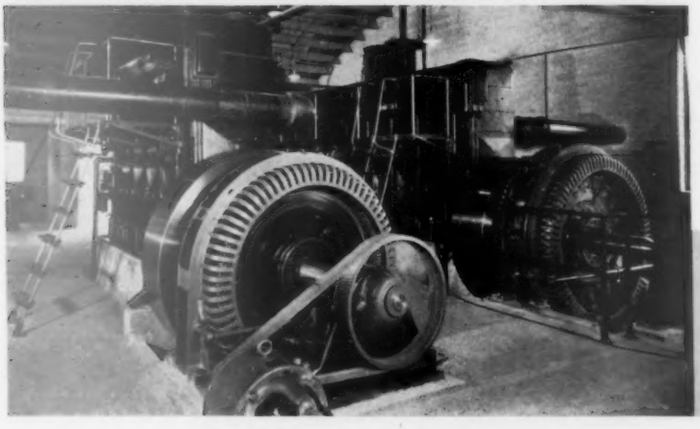
Visit us at the National Crushed Stone Show in St. Louis or the Road Show in Chicago.

BROOKS EQUIPMENT & MFG. CO., 70 Davenport Road, Knoxville, Tenn.

Lets Go! TO THE 23rd ANNUAL CONVENTION AND EXPOSITION OF THE NATIONAL CRUSHED STONE ASSOCIATION







SUPERIOR Diesels may be seen in several of the most successful Diesel plants in the stone industry while attending the convention in St. Louis.

Get the first hand experience of the men who have owned and operated Superiors for several years!

The National Supply Company will be there again this year and make special arrangements for you to see its equipment, not on the exposition floor where plenty of fine new equipment will be on display, but right on the job doing the same work you have to do.

Ask our representative about it!
No obligation.

THE NATIONAL SUPPLY COMPANY
SUPERIOR ENGINE DIVISION
FACTORIES: Springfield, Ohio; Philadelphia, Pa.
SALES OFFICES: Springfield, Ohio; Philadelphia, Pa.; New York, N. Y.; Los Angeles, Calif.; Jacksonville, Fla.; Houston, Texas.

The VANDERWERP RECUPERATOR

View of Recuperator Looking into Kiln Showing Quick Air-Quenching Action on Clinker

DESIGNED AND BUILT BY M MANITOWOC

for Rotary Kilns

- Improved Quality of Cement
- Better Grindability
- Maximum Fuel Economy
- Highest Heat Recovery
- Lowest Maintenance
- Simplest Construction
- Minimum Floor Space
- Moderate First Cost
- Lowest Erection Cost

The Vanderwerp Recuperator is built to four standard designs meeting every possible performance and installation requirement.

It is highly successful on kilns burning coal, natural gas and fuel oil.

The underlying principle of heat exchange inside the kiln insures maximum thermal efficiency with immediate air-quenching effect at the greatest temperature differential between the clinker and the cooling air.

The large number of Recuperators in operation has resulted in recent refinements in design and even further reduction of maintenance expense, already low.

Write, without obligation, for full particulars.

MANITOWOC ENGINEERING WORKS

Division of

Manitowoc Ship Building Company

GENERAL OFFICES AND PLANT
Manitowoc, Wisconsin

CHICAGO OFFICE
131 E. Wacker Drive

Union Wire Rope Men Know Their Rope Dope

LET THEM ANALYZE YOUR ROPE PROBLEM!

Buying wire rope is not only a matter of buying *good* rope. What's more important is buying the *right* rope . . . Our corps of salesmen—always available through our distributors—are *trained* to analyze your problem intelligently and efficiently. And our Engineering Staff stands ready to *use* these analyses—for recommendations that actually mean "ultimate low cost." *Use* the Union Wire Rope Man in your territory.

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Distributors in Leading Cities throughout the Country

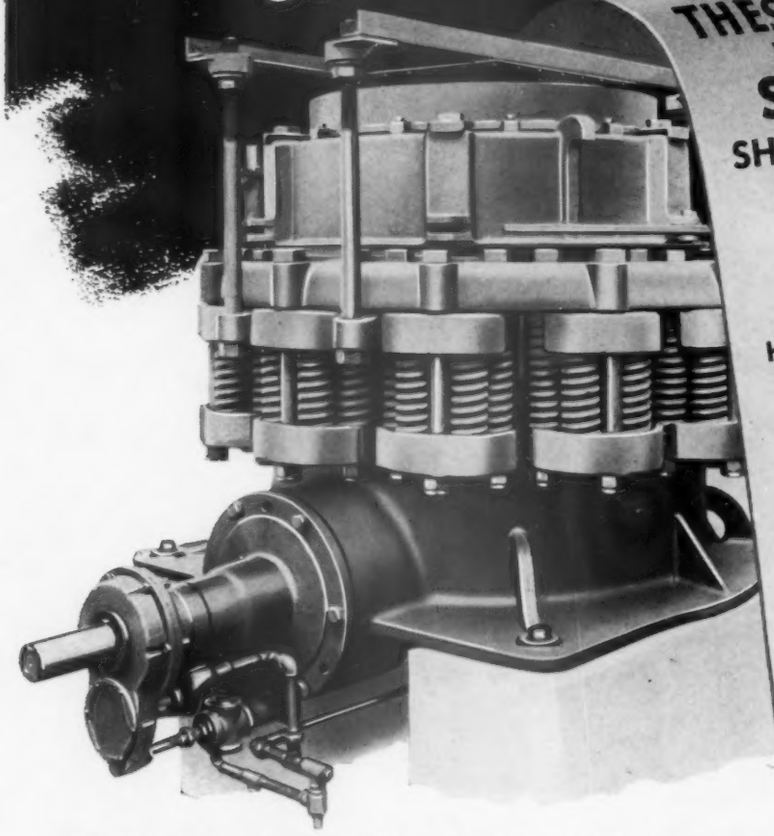
May we send you "ROPE DOPE" regularly?

Just send us your name and address—and we'll mail you every issue of this bulletin. It's informative, educational, belongs in your reference file!

UNION Wire Ropes

The "ULTIMATE LOW COST WIRE ROPE"

MEETING THE DEMAND FOR INCREASED OUTPUT OF FINER SIZED MATERIALS



THESE PRODUCERS DID IT WITH SYMONS SHORT HEAD CONES

BASIC DOLOMITE, INC.,
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THE Symons Standard Cone Crushers, which these producers originally installed, provided sufficient fine materials to meet the then existing needs. Later, however, when the demand for finer sizes greatly increased, Symons Short Heads were added to follow the Standard Cones. It is this combination which solves today's problem of providing a greater capacity of finer products at lower crushing cost as is being proved in plants of these and other progressive producers. If your plant is not equipped to meet the growing demand for fine size materials, investigate the merits of the Short Head Cone and the possibility of adding this Crusher to follow your present secondary crushing equipment.

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

NEW YORK CITY 60 E. 42 St. | LOS ANGELES Subway Terminal Bldg. | TORONTO Concourse Bldg. | LONDON Bush House

SYMONS CONE CRUSHERS

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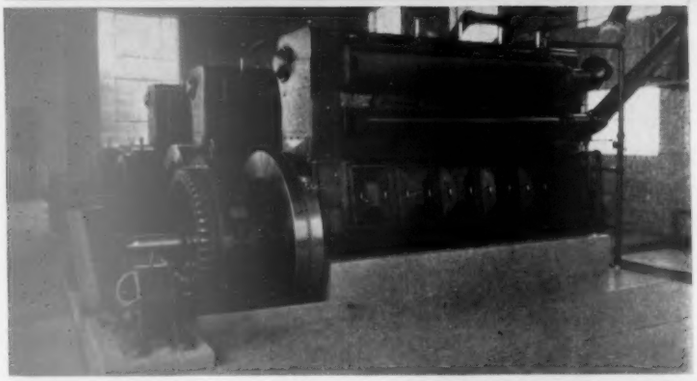

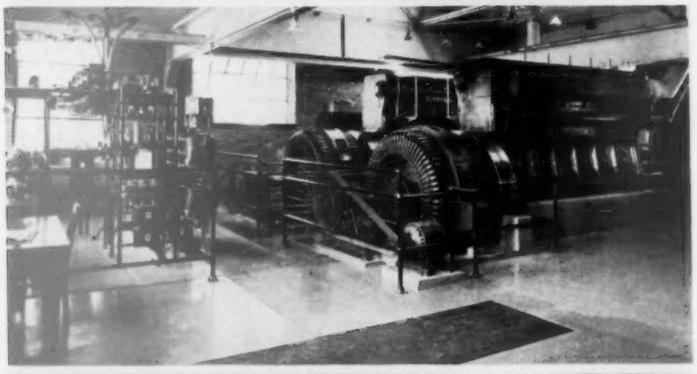

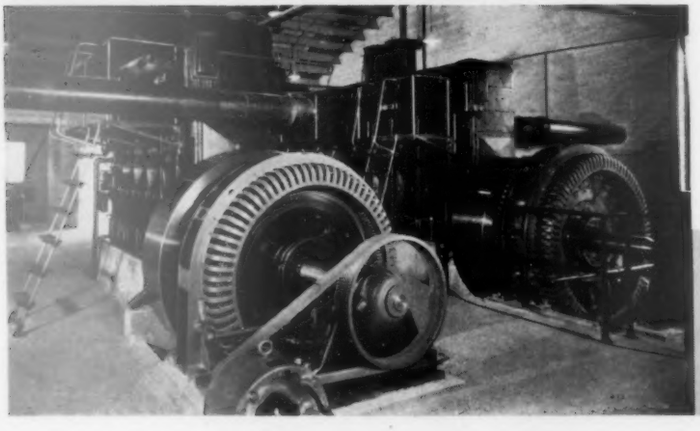

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Division of

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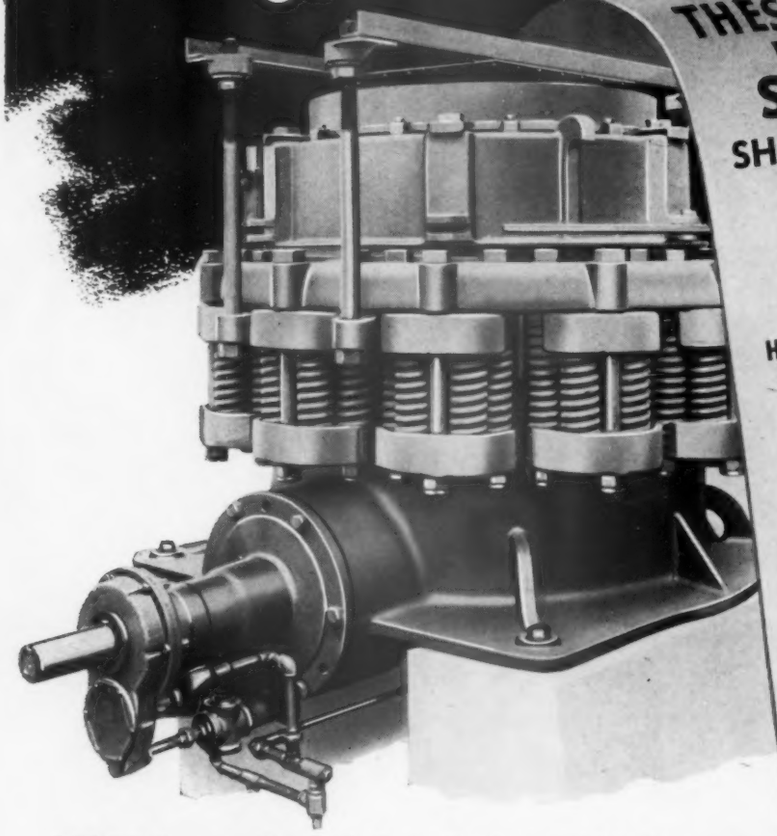
UNION Wire Ropes

***The* "ULTIMATE LOW COST WIRE ROPE"**

1

MEETING THE DEMAND FOR INCREASED OUTPUT OF FINER SIZED MATERIALS



THESE PRODUCERS DID IT WITH SYMONS SHORT HEAD CONES

BASIC DOLOMITE, INC.,
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HOPKINSVILLE STONE CO.,
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OHIO GRAVEL CO.,
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STANDARD SLAG CO.,
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STURGEON BAY CO.,
Sturgeon Bay, Wis.

TREGO STONE CORP.,
Boxley, Virginia

WEST NYACK TRAP ROCK CO.,
West Nyack, N. Y.

THE Symons Standard Cone Crushers, which these producers originally installed, provided sufficient fine materials to meet the then existing needs. Later, however, when the demand for finer sizes greatly increased, Symons Short Heads were added to follow the Standard Cones. It is this combination which solves today's problem of providing a greater capacity of finer products at lower crushing cost as is being proved in plants of these and other progressive producers. If your plant is not equipped to meet the growing demand for fine size materials, investigate the merits of the Short Head Cone and the possibility of adding this Crusher to follow your present secondary crushing equipment.

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SYMONS CONE CRUSHERS

PEAK PERFORMANCE

IN AIR SEPARATION

Sturtevant Separators operate with any type of mill and classify the product to any desired fineness from 50 mesh to 350 mesh material into the micron sizes.

- Close particle size control
- Lower Temperatures
- Quality Cements
- Increased mill capacities
- Maximum specific surface areas
- Minimum production costs

STURTEVANT

for High Early Strength Cement

When you want expert advice or experience-proven equipment, you go to a specialist, who has made a lifetime study of his profession.

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Put your problem up to Sturtevant engineers . . . their broad background of screening and separating experience is yours for the asking.

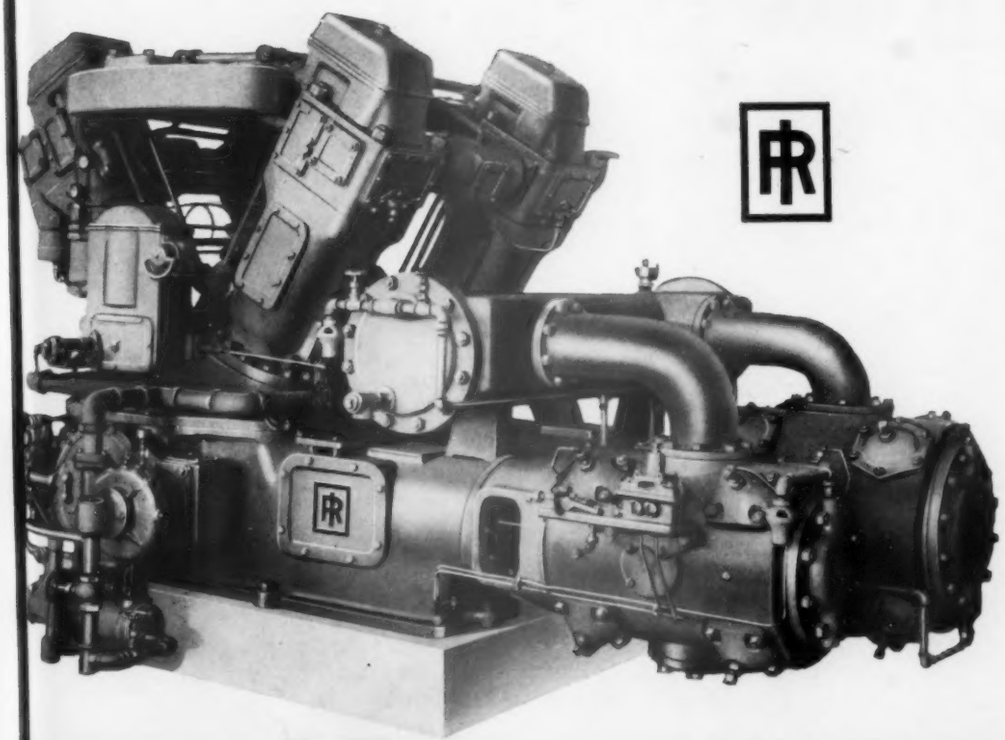
STURTEVANT MILL CO. HARRISON SQUARE BOSTON, MASS.

933 CU. FT. OF AIR for 1¢

*For every cent spent for fuel oil the XVO will compress 933 cu. ft. of free air to 100 pounds pressure.

*Based on fuel oil at 6 cents per gallon.

The New XVO Diesel-Engine-Driven Compressor



THIS new compressor combines a *heavy-duty, four-cycle Diesel engine* and a *horizontal heavy-duty, double-acting compressor* in a single, compact and comparatively light-weight unit which operates at a moderate speed. High over-all efficiency is the natural result of such a unit. It is the outstanding Diesel-driven compressor of today.

This compressor is built in sizes of 4, 6, or 8 power cylinders, rated respectively at 625, 935 and 1250 cfm. actual free-air capacity at 100 pounds pressure. Compressor cylinders can be furnished for vacuums, for pressures up to 5000 pounds, and for air, gas or ammonia compression.

The frame, running gear and compressor cylinders are the same as for our Type XVG gas-engine-driven unit of which there are more than 125,000 installed horsepower. The fuel and combustion systems of the XVO are the same as those of the Ingersoll-Rand Type S Diesel engine, a pioneer in its field.

The XVO is conservatively rated for 24 hours-a-day, full-load service. When economy dictates the use of Diesel engines, the XVO compressor is the logical choice.

More detailed information on its money-saving features is contained in Bulletin 3072. May we send you a copy?

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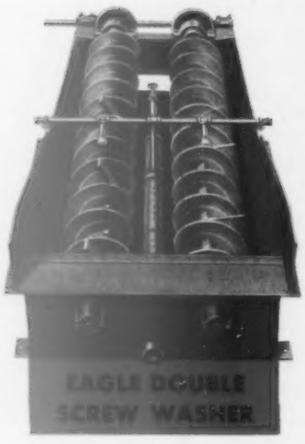
EAGLE WASHERS



EAGLE Sand and Gravel Washers will allow you to enter the better paying markets with a higher grade material. Good concrete always requires clean aggregate, and these machines are a positive assurance of a quality product that will meet all highway and commercial specifications.

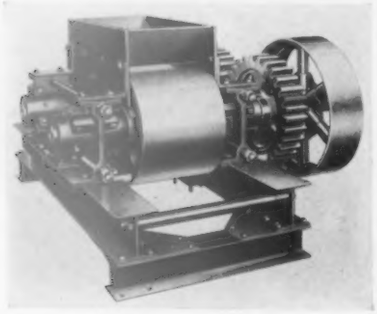
EAGLE Washers are built to a standard which guarantees a long service life, with minimum power and maintenance requirements. They give top production figures, regardless of the refractory nature of the aggregates.

EAGLE Washers are available in Spiral Screw type and Paddle Log type, with single or double screw.

Write for Bulletin

Eagle "Swintek" Screen Nozzle Ladder

"Swintek" is THE profitable dredging machine. Works all deposits. No pumping delays. Saves power, time, labor losses. Increases capacity up to 400%.



Double smooth roll crusher for producing finer sand where deposits do not afford sufficient fines.

See us at Booth 39, National Sand and Gravel Assn., St. Louis, Jan. 17-19

The superiority of EAGLE equipment for nearly three generations of users has not been due to chance or mere sales claims.

EAGLE machines in all industrial lines served, represent the essence of experience and proved facts won the HARD way on actual jobs, under the severest working conditions.

EAGLE engineers have pioneered and developed important exclusive and patented features which explain the stand-out performance of EAGLE units in the sand and gravel industry.

EAGLE machines are built to the varying requirements of individual producers. No effort is spared to preserve the endurance and economy which EAGLE customers have long since grown to expect.

The EAGLE stamp is a nationally recognized symbol of leadership in high-capacity, low-cost equipment. Put EAGLES in *your* plant to secure your place "up front" with the champion operators in the field.

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Specialized Mining Equipment

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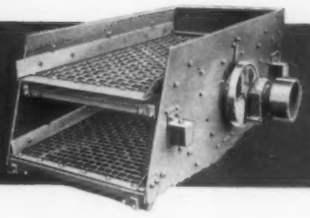
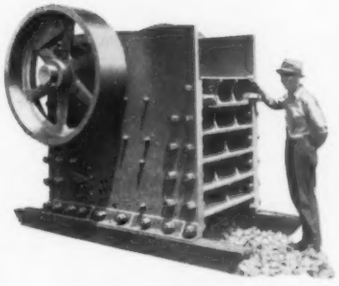
HIGH OUTPUT FOR SALE

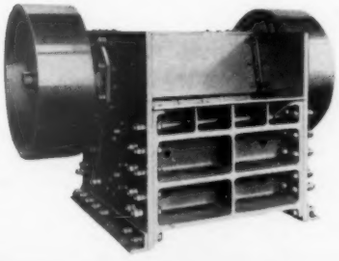


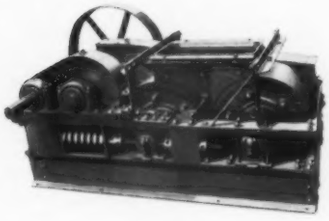
Two-deck gyrating screen. Works with constant efficiency under load. Positive, 4-point balance prevents transmission of vibration to frame. Either one, two or three decks, with screen cloth of any size. Revolving screens also available . . . in 32-inch and 36-inch diameters, in standard 8-foot or additional lengths and with standard round or slotted perforations.



A-W Roller Bearing Jaw Crushers are built in seven sizes All are the time-tested force feed, overhead eccentric type. Available on skids or in innumerable combinations with elevators, conveyors, etc. The No. 2138 illustrated above is particularly suited for quarry service or in pits, handling rocks up to 20 inches.

The A-W 940 (below), operating with force-feed motion, handles stone up to 8 inches, for reduction to any size from 3 inches to ¾ of an inch. As in other A-W Jaw Crushers maintenance costs are low and output high, thanks to oversize roller bearings and shafts operating at high speeds





A-W Roll Crushers (above) have heavy manganese steel shells on both rolls; fixed shafts rotate on SKF self-aligning roller bearings. Chain drive for maximum reliability and flexibility. Exceptional capacity. Inexpensive to maintain.

● Whether you are planning to expand your plant, or eliminate the profit-stealing bottle necks in your production line . . . the high output features which characterize Austin-Western Crushing Plant Equipment should have your close consideration.

The Austin-Western Line is plant-proved to meet a wide variety of fixed and portable plant needs. And each piece of equipment in the line features distinctive high output qualities that effect savings in operating and maintenance costs . . . while contributing to that smooth, balanced production which assures maximum operating profits. Write for full particulars on A-W Jaw and Roll Crushers, Conveyors, Revolving Screens, Gyrating Screens, Complete Portable Crushing Screening Plants, and Washing Plants. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.

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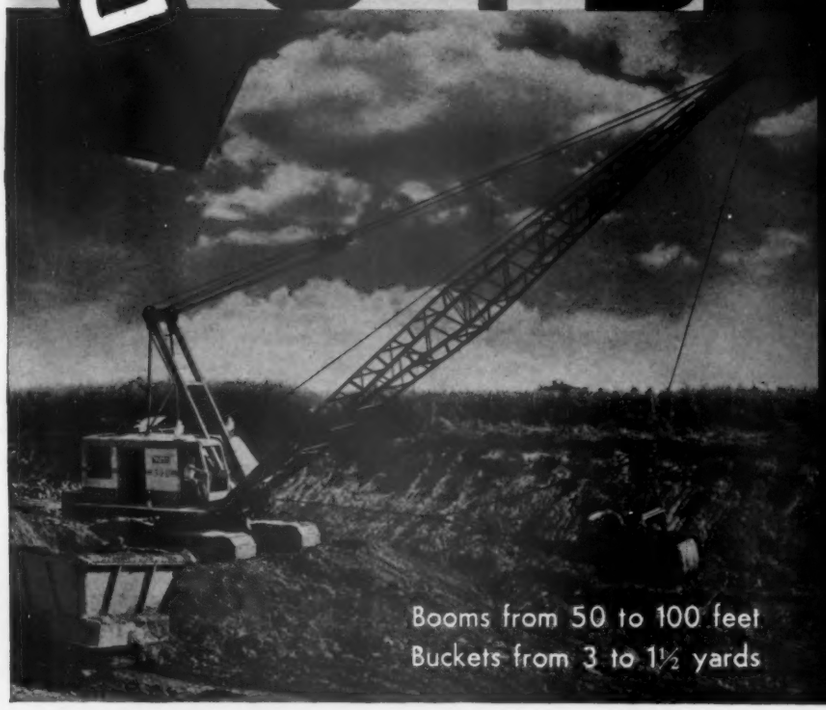

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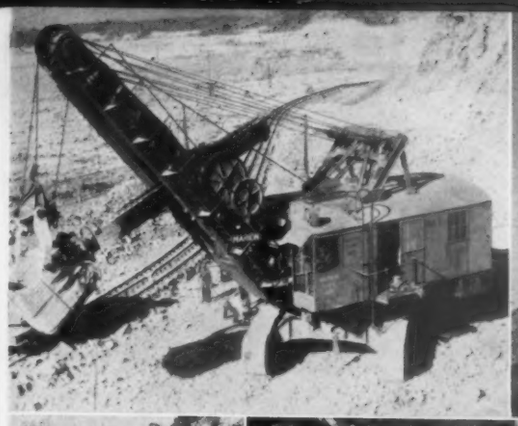

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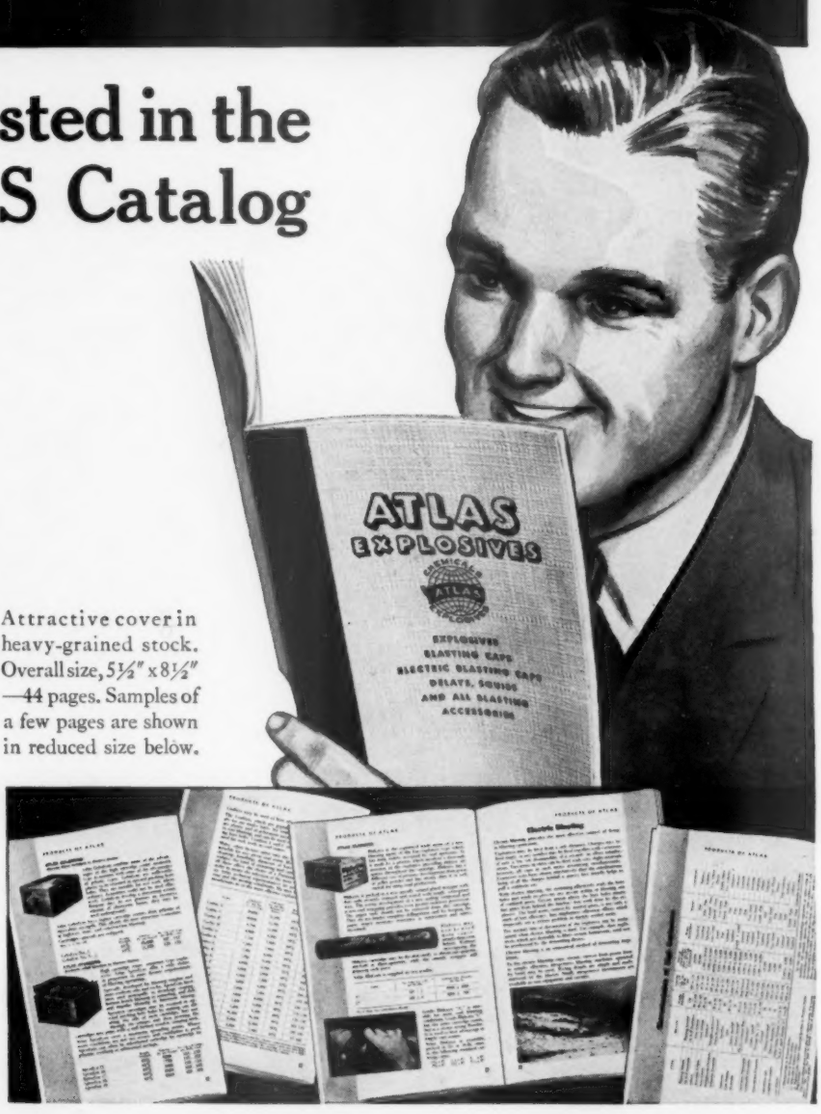

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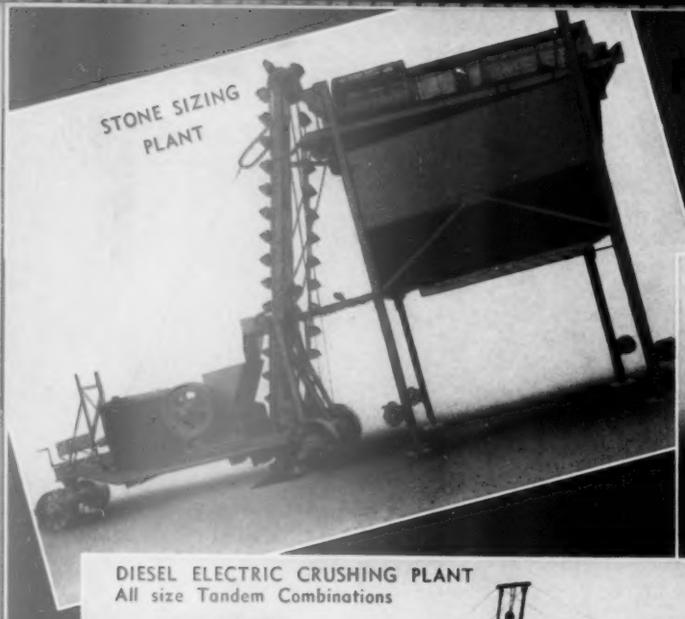

JUNIOR TANDEM CRUSHING PLANT
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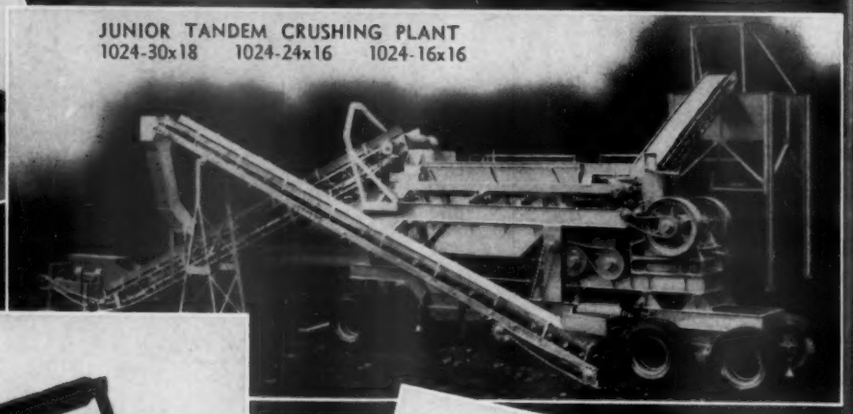

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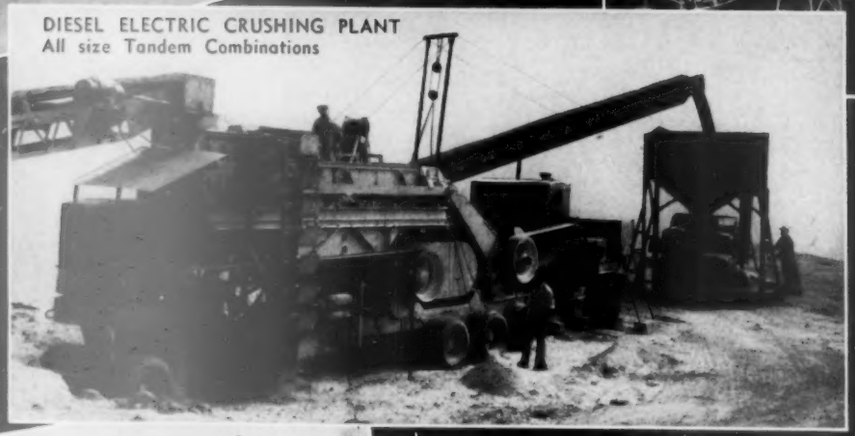
All size Tandem Combinations



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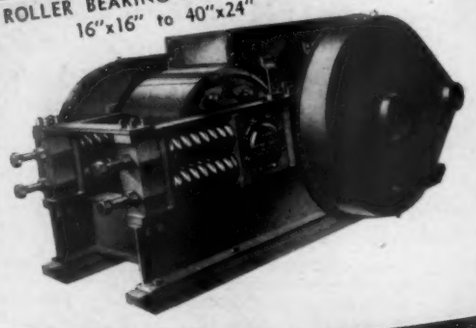

ROLLER BEARING JAW CRUSHER
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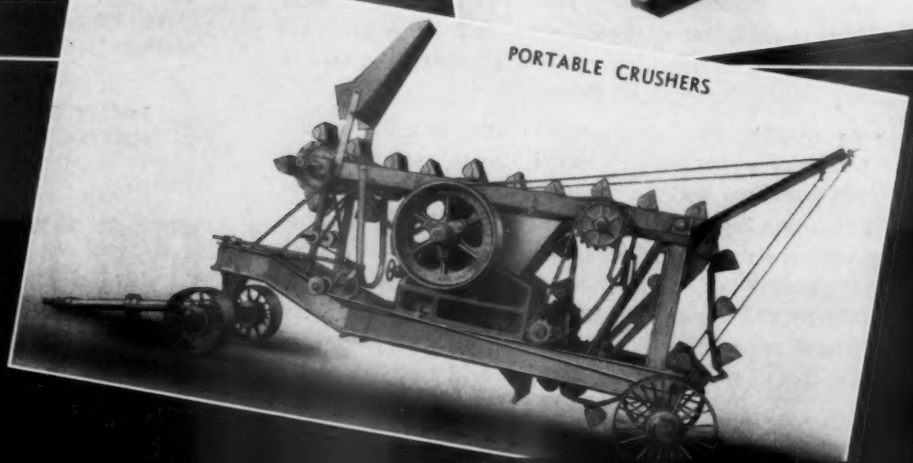
PORTABLE CRUSHERS



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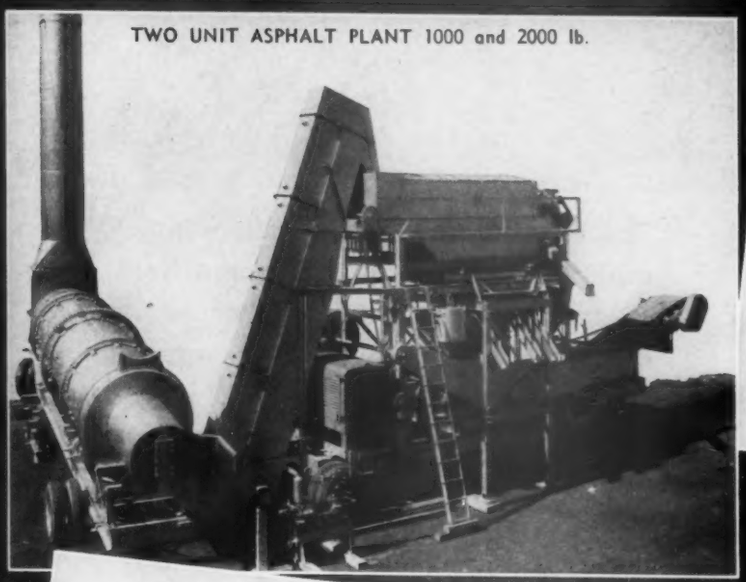
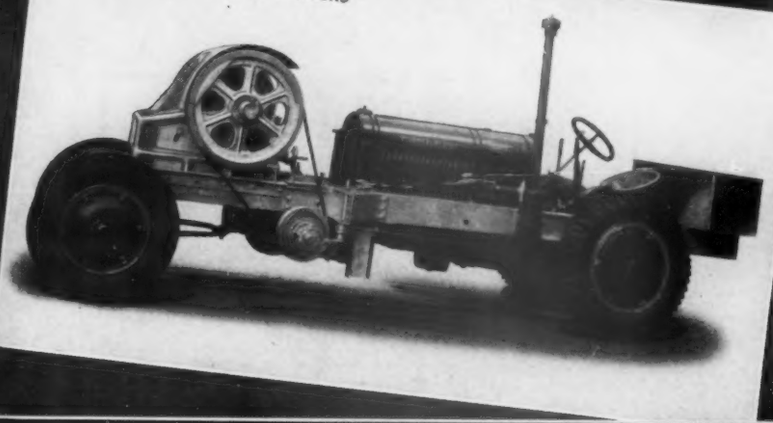


TRAVELING ROADMIX MACHINE

TRACTOR CRUSHERS



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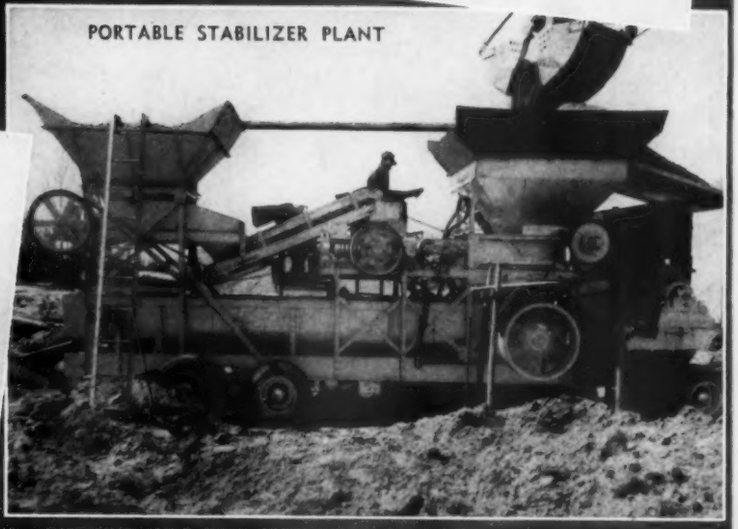

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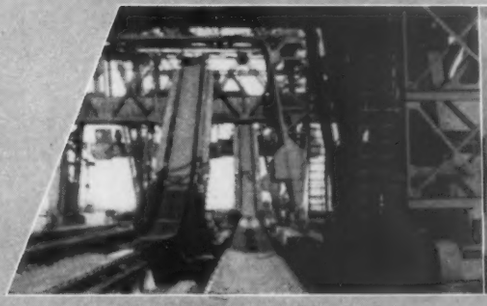

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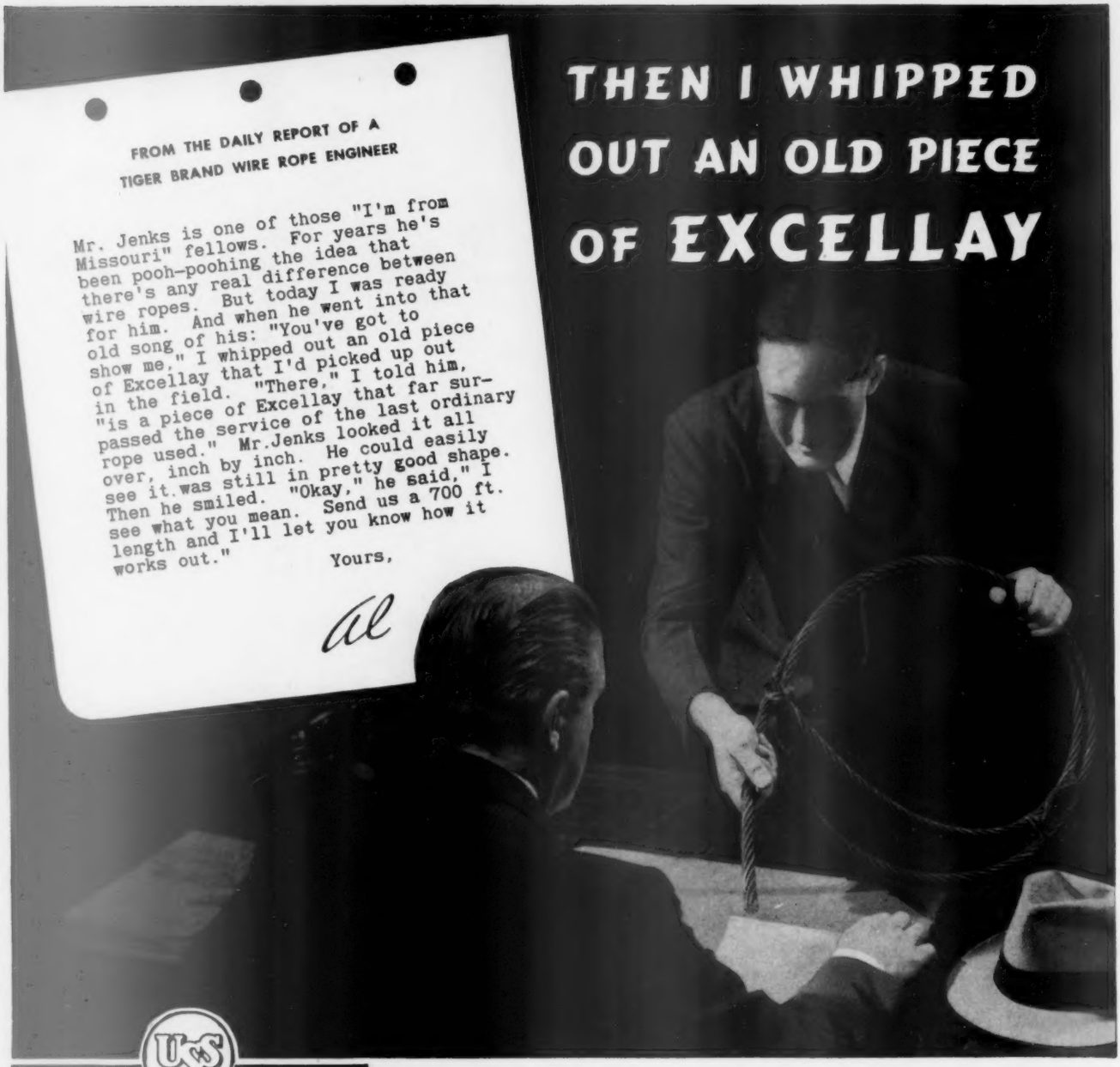
FROM THE DAILY REPORT OF A
TIGER BRAND WIRE ROPE ENGINEER
Mr. Jenks is one of those "I'm from Missouri" fellows. For years he's been pooh-poohing the idea that there's any real difference between wire ropes. But today I was ready for him. And when he went into that old song of his: "You've got to show me," I whipped out an old piece of Excellay that I'd picked up out in the field. "There," I told him, "is a piece of Excellay that far surpassed the service of the last ordinary rope used." Mr. Jenks looked it all over, inch by inch. He could easily see it was still in pretty good shape. Then he smiled. "Okay," he said," I see what you mean. Send us a 700 ft. length and I'll let you know how it works out."
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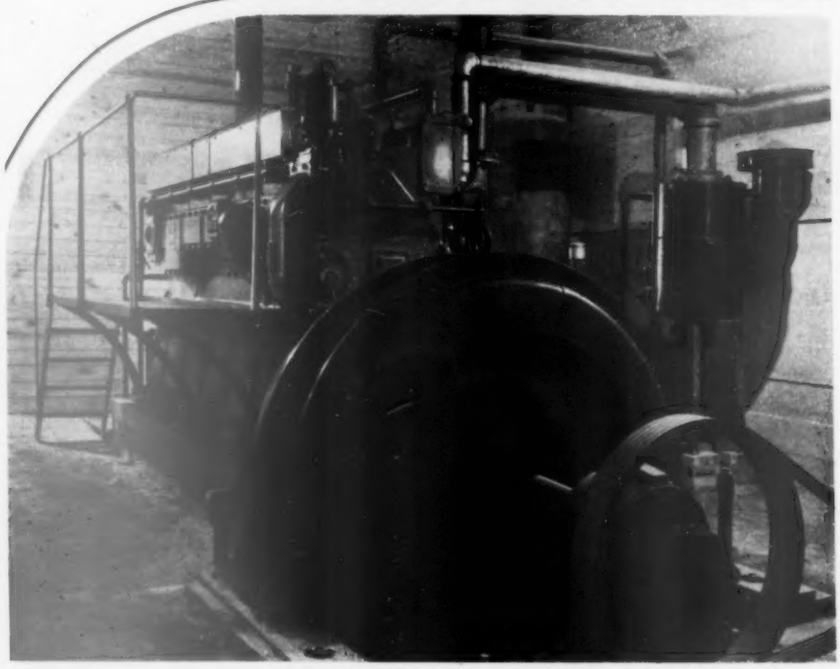

Georgia Coating Clay Company uses a Cooper-Bessemer gas engine to generate power for its kaolin plant at Macon . . . and they produce that electricity for ½c per kw, including overhead and all other charges!

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PIT AND QUARRY

Vol. 32 January, 1940 No. 7

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H. W. BAUMGARTNER
President

STANLEY A. PHILLIPS
Vice-President and Directing Editor

Field Editor:
W. E. TRAUFFER

Assistant Editor:
HARRY F. UTLEY

Circulation Manager:
W. T. KLUSSMAN

Advertising Manager:
JAMES E. MONTGOMERY
Telephone HARrison 9357
Chicago, Ill.

Eastern Advertising Manager:
W. A. WILSON
Room 430, 122 East 42nd St.
Telephone CALedonia 5-4438
New York, N. Y.

Central Advertising Manager:
W. H. SANDERSON
Auditorium Bldg.
Telephone CHerry 4432
Cleveland, O.

Advertising Representatives:
D. R. EGBERT
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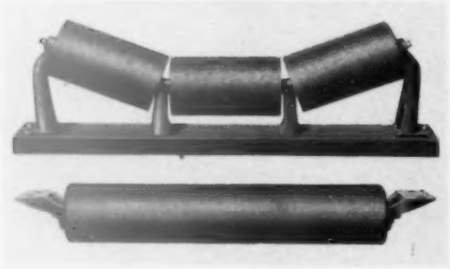

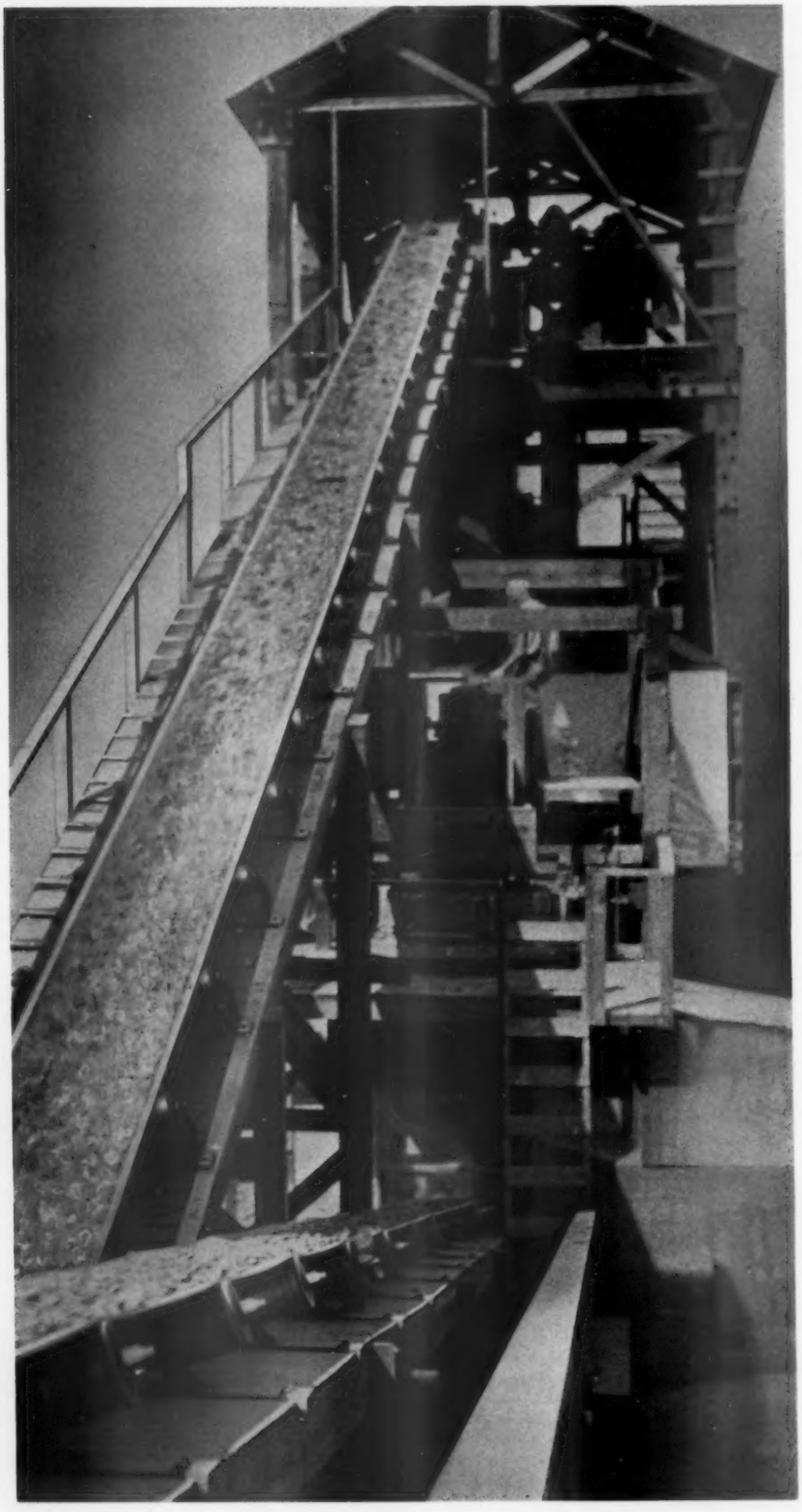

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PIT AND QUARRY

CHICAGO

JANUARY, 1940

Grand Jury Indicts N. Y. Gravel Firms

CHARGE ANTI-TRUST VIOLATION

A New York federal grand jury has indicted a trade association, seven corporations, and 12 individuals in the sand-and-gravel industry on charges of violating the Sherman anti-trust act.

The association indicted was the Long Island Sand & Gravel Producers' Association. The department charged that since its organization in January, 1939, the price of sand had increased 35 per cent. and the price of gravel 20 per cent.

The indictments were the fifth set in a series which began at Washington early in October, when the justice department announced a nationwide investigation of alleged anti-trust activities in the building industry.

Among those indicated [mostly New York men], were the Metropolitan Sand & Gravel Corporation and its president, William A. Atkins of Indianapolis.

Rush Work on Longest Belt-Conveyor System

The Chain Belt Company of Milwaukee has been awarded the contract by the Columbia Construction Company, Inc. of Redding, California, to furnish the belt-conveyor idlers for the 9.6-mile belt-conveyor which will furnish the aggregate for the construction of Shasta Dam.

Over 16,000 Rex troughing and return-belt idlers will be used in making up this transportation system, which is twice as long as any previously built. Twenty miles of 36-inch, 6-ply belting will be required for the system and is to be supplied by the Goodyear Tire & Rubber Company.

Power will be supplied by twenty-five General Electric 200-horsepower 4,000-volt wound-rotor induction motors. The control for this system will consist of twenty-six non-reversing magnetic-control panels and five General Electric thrustor brakes, and accessories.

Sand-Lime Brick Assn. Convenes in February

The annual meeting of the Sand-Lime Brick Association will be held February 12 and 13 at New York, according to an announcement from J. Morley Zander, secretary-treasurer, Saginaw, Michigan.

The meeting is to be held at the Pennsylvania Hotel.

November Contracts Gain Over October

The dollar volume of total construction contracts in November amounted to $299,847,000 for the 37 states east of the Rocky Mountains, according to statistics compiled by F. W. Dodge Corporation. This total was within one per cent of the volume of construction recorded for November, 1938, and represents a 15 per cent. increase over October of this year.

The up-swing in general business activity was reflected in contracts awarded for both commercial buildings, which rose from $13,721,000 in November, 1938, to $20,400,000 last month, and for manufacturing building, which rose from $10,534,000 to $18,481,000. The curtailment in Federal expenditures, however, caused a decline in non-residential building as a whole in November as compared with the corresponding month of last year.

Fire Damages Painted Post Plant Buildings

About $2,000 damage was caused by a fire which partially destroyed the garage and workshop of the Painted Post Sand & Gravel Company, Erwin, New York.

Firemen prevented the blaze from spreading to a nearby office building. A large truck and tools were destroyed as fire razed the west end of the building. The structure was insured.

Compromise Settles Lime-Plant Strike

WORKERS IDLE FOR TWO MONTHS

The strike that has kept the Batesville Lime Company's plant near Little Rock, Arkansas, closed and 80 workers in idleness for two months has been settled in a compromise that was accepted by representatives of both labor and the management.

The settlement was announced by E. G. Hammer, fourth general vice president of the United Cement, Lime and Gypsum Workers International Union after a conference in which he, Clyde Howard, United States conciliation commissioner, and L. T. McCort, representing the management, participated.

The agreement provides for a general wage increase for all classes of workers at the plant, but the "piece work" policy which was the main point of disagreement, is retained. The workers had sought abolition of piece work in favor of an hourly wage.

The new contract provides for increasing the stone-car loading rate from 30 cents a car to 36 cents and a five-cents-an-hour increase in wages for the rest of the plant workers.

Reduces Damage Claim Over Gravel Deposit

The New York state court of appeals has ruled that the judgment obtained by the Squaw Island Freight Terminal Company against the city of Buffalo for damage to its Squaw Island gravel deposits in the Niagara River should be reduced from $497,000 to $92,000. The ruling ends 8 years of litigation.

A supreme-court judge in 1938 ruled in favor of the company. When the case was taken to the appellate division, the city was favored and the company started action in the court of appeals, this court affirming the decision of the appellate division.

Bentonite Operators Feel War Stimulus

SHIPMENTS REACH PEAK LEVEL

The European war has stimulated the bentonite industry in northern Wyoming and adjacent South Dakota, according to the F. E. Schundler Company with headquarters at Belle Fourche, South Dakota. Approximately 350 carloads of ore a month are being shipped from the Belle Fourche and the Newcastle, Wyoming, plants.

The clay is being used in making molds for heavy castings in the manufacture of airplane and tank engines and other heavy equipment, but is not classed as a "war material."

The two plants have increased their output more than 100 per cent., the Schundler Company reports. Other quarries in northern Wyoming also report greatly increased production, and the 1939 production will run well over $1,000,000, it was said. There are three modern processing plants now working to capacity on bentonite production in the Upton and Newcastle areas of Wyoming. All were built since 1926, although the clay has been mined in the state since 1888.

Employers Warned to Pay Higher Wage Rate

Continuing to pay the same salary formerly paid workers for a 44-hour week is a violation of the Fair Labor Standards Act, even though the employer makes a show of compliance through bookkeeping manipulations, according to General Counsel George A. McNulty of the Wage and Hour Division, U. S. Department of Labor.

On October 24, 1939, the statutory minimum wage for all workers engaged in interstate commerce or in work necessary to the production of goods for interstate commerce was raised to 30 cents an hour and at the same time the standard workweek, after which overtime at time and one-half the regular rate of pay must be paid, was reduced to 42 hours.

Association Completes Labor and Wage Survey

Recently the National Sand & Gravel Association sent questionnaires to the entire sand-and-gravel industry in a nation-wide survey of minimum-wage practices in the industry. The necessity for that survey grew out of an announcement by the Public Contracts Division of the U. S. Department of Labor that it would soon hold a public hearing at which would be considered the question of determining prevailing minimum wages in the sand-and-gravel industry under the Walsh-Healey Act.

The association has given the Department the results of that survey. According to Executive Secretary V. P. Ahearn, reports were received for 371 plants in 43 states and the District of Columbia. Those plants reported a total of 5,266 production employees, of whom 2,493 were classified as common laborers, and 2,773 as semi-skilled or skilled employees.

Resolutions Seek Way to Revise Labor Acts

Resolutions calling for revision of the National Labor Relations Act, the Fair Labor Standards Act, the two Securities Acts, and the unemployment-insurance provisions of the Social Security Act were adopted by the 44th annual Congress of American Industry, sponsored by the National Association of Manufacturers, at its closing session December 8 in the Waldorf-Astoria Hotel, New York.

Building and construction materials producers were represented among the 2,000 attending delegates and in committee memberships. Resolutions-committee members included Otho M. Graves, president, General Crushed Stone Company, Easton, and M. O. Matthews, manager, Oklahoma Portland Cement Company, Ada, Oklahoma.

The Spicer Gravel Company of Marseilles, Illinois, plans to rebuild its gravel plant shortly. The new plant will be on the same location as the old.

National to Expand Bronx Gypsum Plant

WILL SPEND OVER $2,000,000

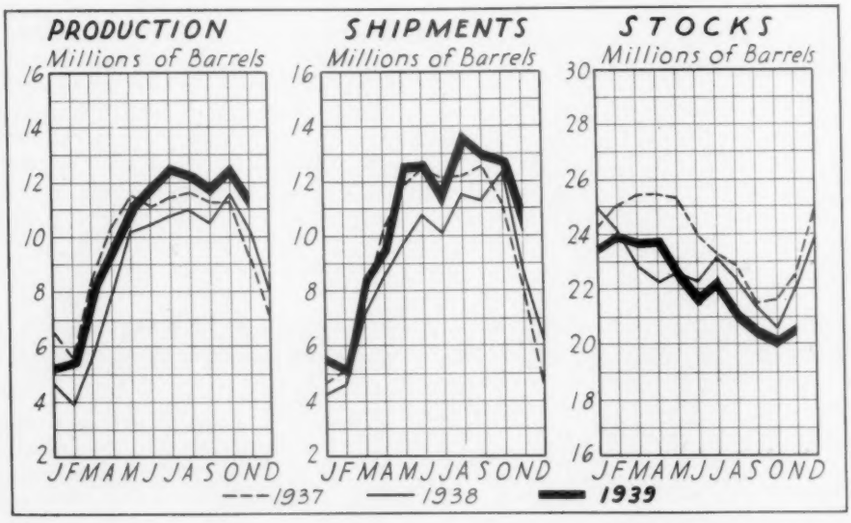
Plans for the expansion and improvement of the Bronx plant of the National Gypsum Company at a cost of more than $2,000,000 have been announced by L. R. Sanderson, a company official. The present Bronx plant of the company is equipped to manufacture plaster and paint. The expansion plan, it was stated, involves the increase in calcining capacity by 50 per cent., provision for larger storage facilities for gypsum rock, improved conveying facilities, construction of a new rock drier and a plant for the manufacture of gypsum board. The property is at Cabot Street and Oak Point Avenue.

First Cargo of Silica Sand Reaches Chicago

The first cargo of silica sand to be transported to Chicago *via* barge on the Illinois waterway was shipped last month and was loaded into the steamship *Thorold* at Chicago. The *Thorold*, one of The Chicago Tribune's fleet of paper boats, took the sand to the Exolon Company at Thorold, Ont.

The 1,450-ton cargo came from the plant of the Ottawa Silica Company at Ottawa, Illinois, on a barge of the John I. Hay Company. Previous shipments from the inland areas were made by railroad.

The sand will be used by the Exolon Company in the manufacture of glass and silicon carbide.



The Portland-cement industry in November, 1939, produced 11,053,000 barrels, shipped 10,146,000 barrels from the mills, and had in stock at the end of the month 20,776,000 barrels, according to the Bureau of Mines. Production and shipments in November, 1939, showed increases, respectively, of 8.5 and 18.3 per cent., as compared with November, 1938. Portland-cement stocks at mills were 6.3 per cent. lower than a year ago.

Good First Quarter Demand Is Predicted

EARNINGS OF LEADERS RISE

With sales volume of gypsum and Portland-cement producers running at the highest point in years and all other lines showing a big advance over 1938, earnings of the building-materials trade in the final quarter should run well ahead of 1938.

Moreover, certain indicators point to a good first quarter for 1940, the *Wall Street Journal* points out. It appears probable that the present better-than-seasonal increase in inquiries for future delivery will be maintained and a heavy carryover of unfilled orders is promised for the year-end.

Sales volume in October approximated that of any of the year's best months in the third quarter, with gains as high as 30 per cent. over 1938 being reported. November likewise has shown substantial advances, although the volume for this month as well as for December will reflect the normal let-down in demand caused by unseasonal building weather.

With the December quarter adding further to the large gains realized in the first nine months, earnings of the trade in 1939 will be impressively higher than in 1938 and profit gains of 50 per cent. and more will be numerous. Profits of the industry as a whole, however, have run below the highly prosperous 1937 year, although it is probable the final quarter's comparison will better that of the earlier periods.

Numerous extra and increased dividend payments by leading suppliers reflect the extent of the upsurge in the trade's earning power. National Gypsum has declared an initial dividend of 25 cents on its common shares. Other recent important payments included a $2 year-end distribution by Johns-Manville and $1.50 extra by U. S. Gypsum. In addition to benefiting from advancing volume, earnings have felt the impetus of a widening profit margin as manufacturing operations have expanded to meet demand. A further favorable factor has been the firming price structure.

The average price of a broad list of building supplies currently shows an increase of 4 per cent. from the level of January 1, last, with the major part of the advance having been registered since September 1, according to the index of the Bureau of Labor Statistics. The present figure stands at 92.9 per cent. of the 1926 average and compares with 89.3 per cent. at this time a year ago.

A good part of the price advance has been due to lumber, but other lines have also worked to higher levels. These include prepared roofing, concrete and concrete blocks, and other materials.

Indicative of the profits that may be expected for 1939 are the results of the first three quarters. During that period earnings in certain instances doubled those of a year ago, with some companies replacing their losses of 1938 with substantial profits this year.

The gypsum manufacturers are making the outstanding showing, with the two leading producers reporting record or near record results. U. S. Gypsum, the leading factor in the field, for the nine months ended with September reported net of $5,730,861 compared with $3,788,945 in 1938. National Gypsum similarly lifted its earnings sharply, net aggregating $1,216,044 compared with $751,008 in 1938.

Portland-cement producers also are doing well. With the exception of Lone Star, these companies confine their reports to 12 months' periods so it is impossible to give the actual nine months' results. However, for the 12 months' periods ended with September, all showed big gains. Alpha's net of $809,769 compared with $109,866 last year, and Lehigh lifted its earnings to $2,062,255 from $487,232. Pennsylvania-Dixie turned a loss of $43,213 in 1938 into profit before Federal taxes of $355,011 in 1939.

The increase in earnings of Lone Star for the nine months ended with September, to $2,476,920 from $2,328,956 in the like 1938 period was less spectacular, but that concern's activities are not as indicative of domestic conditions as those of its competitors. The company, in addition to its domestic trade, does a large business through manufacturing subsidiaries in Argentina, Brazil and Uruguay.

Monolith Closes Its Plant at Laramie

The Monolith Portland Cement Company of Laramie, Wyoming, shut down for the winter on December 16, after a very satisfactory season, according to F. J. Anderson, plant superintendent. Over 900,000 barrels of cement were manufactured and more than 100 men were employed, about the same as in 1938. The superintendent said the length of the shutdown will depend upon market conditions and on the time needed for repairs to the plant.

A new dredging producer, located at Burlington, Iowa, is the Riverside Sand & Material Company.

The company also plans to enter the ready-mixed-concrete field in the near future.

PCA Meeting Draws Large Attendance

ROADSTRUM AGAIN HEADS BOARD

With more than 300 persons identified with the cement industry in attendance, the Portland Cement Association held its 38th annual meeting November 27, 28 and 29 at the Blackstone Hotel, Chicago.

A symposium on Portland-cement quality and Portland-cement specifications, the highlight of the gathering, was held on the afternoon of the first day, with V. N. Roadstrum (Pennsylvania-Dixie), presiding. Guest speakers included: P. H. Bates, chief of the clay and silicate products division, National Bureau of Standards; F. H. Jackson, senior engineer, Public Roads Administration, Federal Works Agency; P. J. Freeman, principal materials engineer, Tennessee Valley Authority; and H. S. Mattimore, engineer of tests and research, Pennsylvania Highway Department.

Standing committees on (1) technical coördination, (2) manufacturing research, (3) technical problems, (4) promotion, and (5) accident prevention met during the meeting and reports on their activities were presented at the session on the second day at which P. C. Van Zandt (Universal Atlas) presided.

Mr. Roadstrum was re-elected chairman of the board, while W. A. Wecker (Marquette) was named treasurer, succeeding S. W. Storey (Consolidated).

A brief business session and a meeting of the new board of directors on Wednesday, November 28, brought the convention to a close.

5 Hurt in Coal-Dust Blast at Hermitage

Five men were reported seriously injured in a coal-dust explosion which occurred on December 6 at the plant of the Hermitage Portland Cement Company on Lower Island, Nashville, Tennessee.

Victims included W. D. Haynes, 33; H. T. McKennon, 26; Clarence Brown, 29; D. D. Horton, 41; and Otho Pardue, 46.

Constructs Modernistic Office in Grand Rapids

A new modernistic office building has been erected at Grand Rapids, Michigan, by the Grand Rapids Gravel Company.

The company is also an important producer of ready-mixed concrete.

Coming Events

January 17-19, 1940—St. Louis, Mo. Annual conventions, National Sand & Gravel Association and National Ready Mixed Concrete Association, Jefferson Hotel.

January 22-24, 1940—St. Louis, Mo. Annual convention, National Crushed Stone Association, Jefferson Hotel.

January 29-February 2, 1940—Chicago, Ill. Annual convention and show, American Road builders Association, International Amphitheatre.

February 12-14, 1940—Washington, D. C. Annual conventions, National Concrete Masonry Association and Cast Stone Institute, Mayflower Hotel.

February 15-17, 1940 — Chicago, Ill. Thirty-third annual convention, American Concrete Pipe Association, Palmer House.

February 27-29, 1940—Chicago, Ill. Thirty-sixth annual convention, American Concrete Institute, Palmer House.

May 7-9, 1940—Cincinnati, O. Annual convention, National Concrete Burial Vault Association.

Feldspar Resources of Illinois Are Studied

According to information received from the Illinois State Geological Survey an exploratory study is being made by that organization of the feldspar content of certain glacial sands in Illinois. Recently in the course of studies having other objectives, it was found that there are considerable deposits of sands having a feldspar content of 10 to 25 per cent. As to whether or not such Illinois sands can become commercial sources of feldspar involves the consideration of a number of factors which are now being investigated. Among them is the problem of a commercial method of separation and the determination of composition and purity.

The present sources of commercial feldspar in the United States are located at a distance from Illinois, in Colorado, South Dakota, New Hampshire, North Carolina, and other states. Transportation charges from these points is obviously a considerable item in the market price of feldspar in Illinois.

Requiem

Some of the industry's leaders who passed away during 1939.

JOHN M. BUCKLAND, 62, president, National Slag Company, Allentown, Pennsylvania.

LOUIS A. SLATTERY, 52, vice-president, Hudson River Stone Corporation, New York.

JAMES M. GAGER, 58, president, Gager Lime Manufacturing Company, Chattanooga.

HANS H. MUEHLKE, 66, treasurer, Lone Star Cement Corporation, New York.

S. T. CRAPO, vice-president and secretary, Huron Portland Cement Company, Detroit.

HARVEY A. TUTEWILER, 49, president, Ready Mixed Concrete Corporation, Indianapolis.

HORACE E. STUMP, 51, chemist and research director, New England Lime Company.

LINCOLN M. THOMPSON, 57, president, Thompson-Young Sand Company, Jefferson City, Missouri.

JAMES B. ADAMS, 72, president, Longview-Saginaw Lime Works, Birmingham.

G. RAYMOND PRINCE, 43, president, Prince Ready-Mixed Concrete Company, Camden.

EUGENE SWITZER, 63, general superintendent, Petoskey Portland Cement Company, Petoskey, Michigan.

REUBEN J. MORSE, 63, vice-president and general manager, Ideal Cement Company and subsidiaries, Denver.

EMIL STROH, 75, president, Wabash Portland Cement Company, Detroit.

W. LEONARD CATEN, 45, vice-president, W. H. Loomis Talc Corporation, Gouverneur, New York.

EDWARD M. GRAY, 72, president, Central Iowa Sand & Gravel Company, Des Moines.

RALPH S. WEAVER, 67, president, Allentown and Valley Forge Portland Cement Companies.

C. P. BEEVERS, 73, president and treasurer, Peery Lime Company, North Tazewell, Virginia.

JOHN DIETERMAN, 68, general superintendent, Quincy plant, Wolverine Portland Cement Company.

DARIUS B. HUNKINS, 58, president, Peerless White Lime Company, St. Louis.

T. FRANK QUILTY, vice-president, Moulding-Brownell Corporation, Chicago.

FRED L. MAUNTLER, vice-president, Ohio Hydrate & Supply Company, Woodville.

K. H. WINTHER, 42, superintendent, National Portland Cement Company, Brodhead, Pennsylvania.

B. COWDEN, 76, secretary-treasurer, Southern States Portland Cement Company, Rockmart, Georgia.

RALPH E. McLEAN, 63, president, East St. Louis Stone Company, East St. Louis, Illinois.

FREDERICK W. OHLEMACHER, 68, vice-president, Kelley Island Lime & Transport Company, Cleveland.

HOMER A. SCHOLZE, 66, vice-president, Union Sand & Gravel Company, Huntington, West Virginia.

I. J. SAUVEY, 63, superintendent, Marblehead, Ohio plant, Kelley Island Lime & Transport Company.

REGINALD F. RICHARD, general manager, phosphate division, Monsanto Chemical Company, St. Louis.

JOHN KAMINSKA, 57, chief engineer, Fredonia, Kansas, plant, Consolidated Cement Corporation.

JOHN WUNDER, president, Trap Rock Corporation of Minneapolis.

ADAM L. BECK, 77, president, and manager, Great Lakes Portland Cement Company, Buffalo.

WALTER C. ANDERSON, 61, general manager, Southern Limestone Company, Harriman, Tennessee.

CHARLES I. KING, 60, vice-president and general superintendent, Portsmouth Sand & Gravel Company, Portsmouth, Ohio.

GEORGE L. RAETHER, chief chemist, Canada Cement Company, Ltd.

ARTHUR H. TAYLOR, 58, president, White Hill Sand & Gravel Company, Salt Lake City.

SAMUEL J. BREW, superintendent, Waukesha Sand & Gravel Company, Milwaukee.

NEWS HIGHLIGHTS OF 1939

January

Industries' trade associations gather in annual conventions at Cincinnati. . . . Southern Materials Corporation launches new $250,000 aggregates operation on Norfolk waterfront. . . . First shipment of gypsum rock reaches new Savannah plant of National Gypsum from Nova Scotia. . . . Medusa Portland Cement Company acquires site for new packing-and-storage plant at Holland, Michigan.

February

Concrete industries convene at Chicago; St. Louis host to Sand-Lime Brick Association. . . . Rehabilitation of Lehigh's Alsen, New York, plant proceeds rapidly. . . . National Slag Association elects George A. Mattison (Woodstock Slag Corporation) president for 1939. . . . Professor C. H. Scholer takes leave of absence to do special research for Portland Cement Association.

March

Dynamite explosion kills two, injures scores at Colorado Portland Cement Company plant. . . . Five New York concrete-pipe concerns indicted for conspiracy to defraud. . . . Survey predicts sharp increase in earnings for cement industry. . . . Currier Lumber Company erects one of nation's largest concrete-block plants at Detroit.

April

National Sand and Gravel Association seeks seasonal rating for industry. . . . Florida's cement "tax" finally held invalid by United States Supreme Court. . . . Volume of residential building reaches highest point in ten years.

May

Government asks bids on 5,800,000 barrels of low-heat cement for constructing Shasta Dam in California. . . . National Industrial Sand Association convenes at Atlantic City. . . . Universal Atlas awards contract for packing plant at Muskegon, Michigan. . . . Aggregates producers discuss determination of minimum wages in conference at nation's capital.

June

Newly-formed Permanente Cement Corporation submits low bid on Shasta Dam cement needs; announces plan to build new plant. . . . Universal Atlas Cement Company moves headquarters from Chicago to New York. . . . Celotex Corporation purchases plant and assets of American Gypsum Company. . . . Seven-story office building under construction at Allentown by Lehigh Portland Cement Company.

July

Southern lime manufacturers organize the Southeastern Lime Institute to promote and extend the uses of lime. . . . J. A. McCarthy named president of the Pacific Portland Cement Company succeeding R. B. Henderson, who had been inactive for some time. . . . The American Rock Wool Company spends approximately $100,000 in improving its plant at Wabash, Indiana.

August

Employment and pay rolls in the quarrying and cement industries move sharply upward. . . . Plans completed by the Alpha Portland Cement Company to construct 18 additional storage silos at its Cementon plant. . . . Contracts for 3,585,000 barrels of cement for Grand Coulee Dam divided among seven western producers. . . . The Wisconsin Public Service Commission investigates alleged irregularities in shipments, and shipping rates, of cement by motor-truck.

September

More than 500 workmen busy rushing to completion the new plant of the Permanente Corporation near Los Altos, California. . . . The Becker County Sand & Gravel Company erects $75,000 aggregates plant to serve the Santee-Cooper Dam project in South Carolina. . . . The Carney Cement Company of Mankato, Minnesota, prepares to erect a new mineral-wool plant. . . . Construction volume was continuing upward with all classes sharing in the gains.

October

Annual congress of the National Safety Council held in Atlantic City, P. N. Bushnell of the Missouri Portland Cement Company being elected general chairman of the Cement and Quarry Section. . . . Chert gravels blamed for concrete-pavement failures in Kentucky by state's highway-department engineers. . . . A definite trend away from small lime plants noted by the Bureau of Mines in report covering a survey of the industry.

November

The pit-and-quarry industries have received nearly a half billion dollars worth of orders for WPA projects according to an official report from Washington. . . . Construction is scheduled to start on a huge new clinker-storage building at the Middle Branch, Ohio, plant of the Diamond Portland Cement Company. . . . Five persons indicted at Washington, D.C., after weeks of a jurisdictional dispute between the engineers' and teamsters' unions regarding the operation of ready-mixed-concrete trucks.

December

The largest belt-conveyor system ever built, nearly ten miles long, being fabricated to transport aggregates from the plant of the Columbia Construction Company to the site of Shasta Dam. . . . Important data on the relative merits of vibration versus tamping in the manufacture of concrete blocks revealed in the report covering year-long tests at the University of Wisconsin. . . . With European competition sharply curtailed because of the war, cement manufacturers along the eastern seaboard enjoy better prices than had prevailed in years. . . . For alleged price-cutting, 34 aggregates producers in southern California cited in an injunction proceeding at Los Angeles.

CURRENT BUSINESS INDICATORS

Business in general remained firm as 1939 came to a close but apprehension regarding 1940 was felt in many quarters for it is claimed that buying has not maintained the accelerated pace set by production. Even in the petroleum industry, which retained remarkable stability throughout the depression, stocks of gasoline at the close of the year were virtually at an all-time peak, largely because the anticipated rush of foreign orders failed to materialize. Nevertheless, the Federal Reserve Board adjusted index of industrial production advanced from 121 in October to 124 in November, and somewhat less than the customary seasonal decline was apparent during the first half of December.

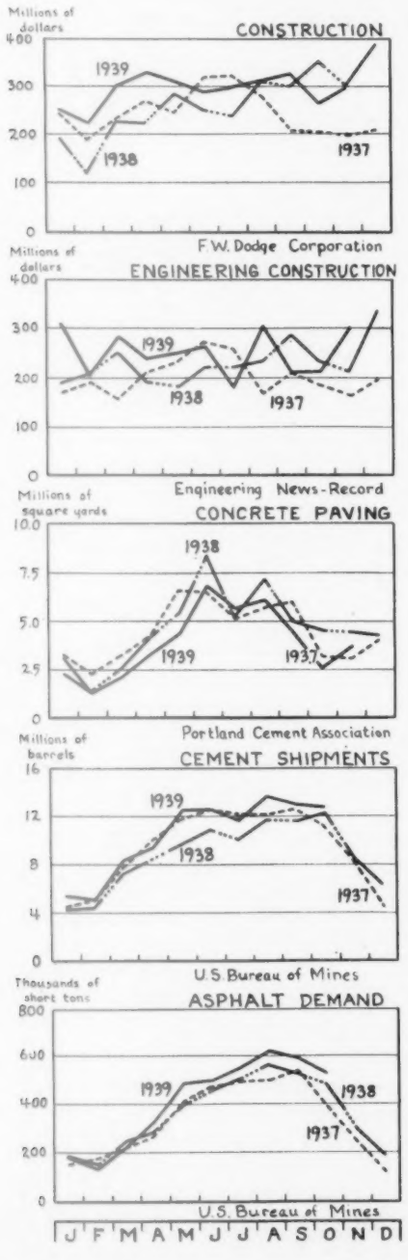
The steel industry continued its record production of steel ingots, although output dropped from the peak of 94.4 per cent. of capacity for the week ended December 2 to 91.2 per cent. for the week ended December 16. This level was fully 50 per cent. above the comparable period of 1938 and more than three times that of 1937. The board's index of iron-and-steel production for 11 months of 1939 was about 65 per cent. above 1938 and, according to the Census Bureau, production of malleable castings was about 70 per cent. higher. The output of molding sand, refractories, and other nonmetals consumed in iron and steel manufacture apparently increased in 1939 at a comparable rate.

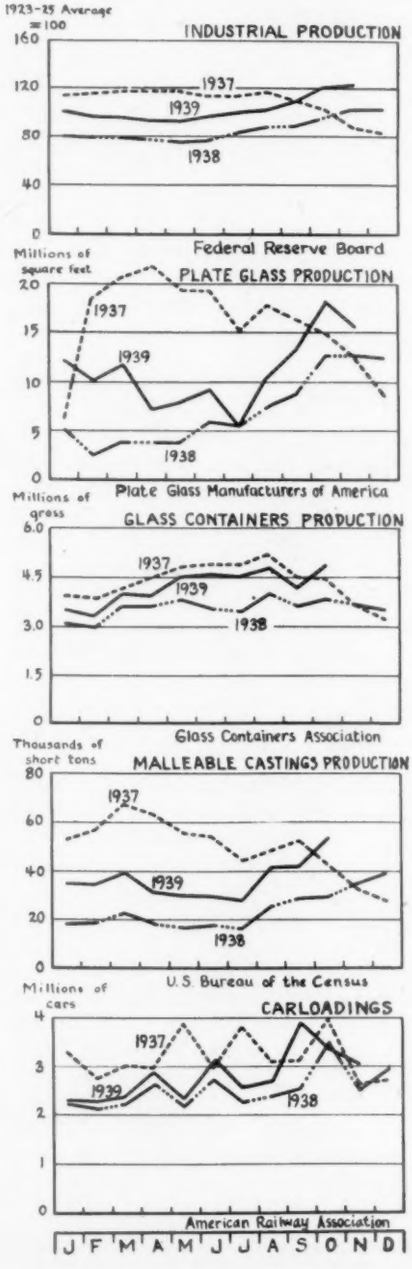
Although steel was outstanding, other industries also increased sharply in 1939. A comparison of 11 months of 1939 with 1938 (in a few instances 10 months) is given in the following tabulation of indicators of the demand for nonmetals.

	Increase or decrease in 1939
Industrial production	+ 23%
Iron and steel	+ 65%
Malleable castings	+ 70%
Total construction	+ 14%
Engineering construction	+ 12%
Concrete paving	— 14%
Cement shipments	+ 15%
Asphalt demand	+ 9%
Glass containers	+ 20%
Plate glass	+ 69%
Carloadings	+ 15%

The value of construction contracts, as reported by the F. W. Dodge Corporation for 37 States east of the Rockies, increased in November and for 11 months exceeded 1938 by 14 per cent. Engineering construction, according to *Engineering News-Record*, increased 12 per cent. in 1939, but the Portland Cement Association reported a decline of 14 per cent. in concrete-paving contracts awarded. This seems a bit confusing, for cement shipments during 10 months were 15 per cent. higher in 1939 than in 1938. Asphalt demand was up 9 per cent. in the same period. The evidence points toward an increase of 10 to 15 per cent. in the demand for sand and gravel, crushed stone, and slag aggregates in 1939 compared with 1938.

With the Federal Reserve Board index of volume of industrial production at 124 in November, American industry was at an all-time peak for that month. In 1928 the November index was 117 and in the same year December was 118. Present indications are that December, 1939 will remain well above the 1928 level and that industry will pass from 1939 to 1940 at the highest year-end rate of output in the history of our country. In fact the actual volume of production of the past three months has been exceeded only by the peak in 1929 and even then by only a narrow margin. The uncertainty of the European situation, however, dulls the otherwise bright outlook for 1940.





Private Building Up as Busy Year Ends

THREAT SEEN IN RISING COSTS

The year 1939 closed with private building and engineering work going at a fairly satisfactory rate and public construction very markedly on the down-grade. General business and industrial activity, on the up-grade since June 1939, were given an added stimulus by the outbreak of war in Europe and revision of American neutrality legislation, the F. W. Dodge Corporation points out.

The war's effect on private construction, so long as America remains neutral, is apt to be indirect; insofar as war purchases by belligerents offset decreases of our foreign trade brought about by neutrality regulations, and sustain a rising volume of industrial production, employment, and retail trade, and increase national income, they will act as a stimulus to all classes of private construction. The war's effect on public building and engineering work is more direct, shifting the emphasis of public expenditures away from purely civilian improvement projects to construction projects included in or directly related to the national defense program.

Construction undertaken by the War and Navy Departments will be divided territorially about as follows: 56 per cent. of the total in the Canal Zone, Puerto Rico, Hawaii and other colonial possessions, 12 per cent. in the Pacific Coast area, and only 32 per cent. in the 37 eastern states covered by the Dodge figures. Army and Navy construction are thus likely to partially offset the probable declines in regular public works activities. A moderate-sized P.W.A. program, consisting principally of strategic highways, airports, hospitals, and some power plants may be authorized by the next Congress.

Two Federal programs have large carry-over funds. One is the regular Federal aid highway program, the other the subsidized public housing program of the United States Housing Authority. These large funds tend to offset very considerably the anticipated declines in other classes of public construction activity.

The threat of rapidly rising construction costs is still a real one, and has been recognized as such practically throughout the industry, as well as in other fields of business and in government. At the moment, self control by industry appears to be a sufficiently potent factor to avert the dangers of price inflation through most, if not all, of 1940. Building-cost increases are expected to be moderate and will not be a vitally important factor in determining total construction volume in 1940.

Consideration has been given to the fact that 1940 will be a presidential election year with possible political controversies affecting business confidence. The possibility of a minor dip in industrial activity and of a continued slowing of construction through the first quarter has also been taken into account. An effort has also been made to discount over-optimistic estimates of foreign purchases. It seems safe to assume that the United States will not be in the war in 1940 or even be moving definitely toward a war declaration; we are not, however, entirely justified in dismissing all consideration of the possibility of peace in Europe. A moderately slow start with rising rates of activity as the year progresses is the indicated trend in the building industry. Commercial, manufacturing, and private residential building are apt to increase most markedly in particular industrial centers receiving large war orders. This factor, together with the relatively large Army and Navy construction planned for the area, indicates a relatively high acceleration of activity in the Pacific Coast states.

Urge Gravel Company End Dust Nuisance

The Buffalo Gravel Corporation, through its president, Charles F. Strasmer, Jr., was directed in Buffalo city court to find a way to prevent sand from blowing about the neighborhood where its yards are located here.

About 25 residents of adjacent streets appeared in court with an inspector of the department of health to complain that sand blows from piles and from a flume in the yards into their homes.

Mr. Strasmer, acting as his own attorney, questioned the witnesses. He contended other companies located along the Niagara River are as culpable as his own firm in permitting sand to spread about the neighborhood.

Material Service Corp. Buys Moulding-Brownell

The Moulding-Brownell Corporation, Chicago, has been acquired by the Material Service Corporation, prominent Chicago aggregates producer and dealer in building materials.

The several aggregates plants operated by the Moulding-Brownell concern were included in the transaction.

Improvements costing about $125,000, including the erection of new clinker-storage facilities, are being made at the Houston, Texas plant of the Lone Star Cement Corporation.

Shiely Rules as King of Winter Carnival

ST. PAUL TO FETE VISITORS

Joseph L. Shiely, head of the J. L. Shiely Co., St. Paul, and former president of the National Ready Mixed Concrete Association, has been named King Boreas VI, ruler of the 1940 edition of the nationally-famous St. Paul Winter Carnival.

A former newsboy, Mr. Shiely rose to command a sand and gravel empire which stretches from St. Paul to the Pacific Coast. He comes from a family prominently identified with the life of St. Paul and the Northwest.

In the years before 1914, when he formed his own company, Mr. Shiely built many of the tunnels, depots, and bridges in North Dakota, Montana, Idaho and Washington for the Northern Pacific and Great Northern railroads. He was intimately associated with the latter road for many years. On the huge Fort Peck dam in Montana, Mr. Shiely filled the largest sand-and-gravel contract ever let in the world.

The new king's hobbies are golf, duck hunting and flying. He and Mrs. Shiely have five children, three sons and two daughters.

Highlights of the St. Paul carnival include a huge, towered ice palace constructed of 20,000 blocks of ice; a gigantic Grande Parade in which 30,000 uniformed marchers, 60 crack drum corps and 60 dazzling floats pass in review; an all-professional ice show, brilliant pageantry, gay masked balls, fireworks displays, and a huge toboggan slide and ski slide.

New Aggregates Plant Planned in Illinois

The Material Service Corporation of Chicago is completing arrangements for the opening of an extensive new plant near Plainfield, Illinois, according to reports.

Approximately 500 acres in the vicinity are to be worked when the project gets under way, it is said.

New Firm Takes Over Mineral-Wool Plant

Superior Insulations, Inc., has been formed at Toledo by W. C. Davis, who heads the company.

The concern has taken over a mineral-wool plant at Lagro, Indiana, is making improvements and has gone into production.

EDITORIAL

Look to the Future!

NEARLY every business man with whom one talks these days is bitter in his complaints about what he refers to as "conditions." Despite a marked and continued improvement in the state of business generally—an improvement in which he has shared, even though he may be hesitant about admitting it—he seems to be overcast by the shadow of some impending disaster. He may not be able to analyze it, he may not be able to define his fears, but his alarm persists and a sense of futility stifles his initiative. Men who formerly braved every commercial danger, who assumed risks gladly, who went out of their way to take chances, whose judgment could be relied upon in every kind of emergency, seem to have lost their nerve. Their attitude toward the future—particularly that little part of it which they call the "immediate" future—is one of resignation instead of a hopeful and aggressive desire to move forward. On close examination this collapse of moral courage is too often found to be a loss of confidence in self—a growing belief that he is the victim of a general conspiracy seeking his economic and social ruin; a feeling that life is too complicated, the weight of social pressures too great, to allow the individual even a fighting chance. Men who contributed much to the development and strengthening of society have come to fear it.

These fears are not wholly unreasonable; they are not without some basis of fact. Life has become more complex. Almost daily new alinements of individuals create new conditions, new problems, new desires, and we find ourselves exposed to new pressures, new restrictions, new responsibilities. In a society as highly stratified as the one in which we live, the interests of different sections of the population collide with the interests of others; strata overlap, criss-cross, divide, and lay their weight upon others, so that the individual finds it increasingly difficult to make his way about. No man escapes the puzzling and sometimes baffling confusion of it all; the mere act of living necessitates the adoption of an attitude of pliability, if one is to survive. He who wishes to follow a path across the scene —even the path of least resistance—must be prepared to adopt and adjust, to concede and recede, to give way in order to make way.

The impotence and interdependence of individuals is the outstanding characteristic of life in modern society. The days when a man—any man—could hack out his own fortune, independently of his fellow beings, have passed. Individual initiative is still a grand possession, even surrounded with the social restrictions that hamper its complete utilization; but it has lost the power it once had, it is no longer able to set the target, choose the weapons, make the rules, and limit the competition, alone. What the individual has lost in the exercise of personal initiative, he has lost, too, in the conduct of his business. No commercial or industrial enterprise, from the pressing of trousers to the rolling of steel rails, is any longer the private hunting ground of an individual. Deeds, stock certificates, grants and privileges are still the indicia of legal ownership, but the exercise of the rights which they protect are circumscribed by so many restrictive influences that they can no longer be thought of in the old way, as the credentials of absolutism. No business man is wholly independent of his sources of material supply, of the desires and whims of his prospective customers, of the demands of his workers, of the threats of his competitors. Every function of his business is shaped by, and performed within, the limits imposed by the conflicting aims and activities of others. No policy can be adopted, no action can be taken, without some consideration of its effects on other persons and of their reactions to it. Products, production, prices, profits, wages, working conditions—the things which men formerly thought of as purely personal concerns —must be determined to-day in the light of changing customs, changing competitive conditions, changing conceptions of social responsibility.

IT may be a shock to individual pride; but no one can "go it" alone. It may be disturbing to one's settled beliefs; but the lone wolf in business is as abnormal an individual as the anti-social creature in other phases of life. Society offers no prizes to either; neither one can gratify his overly-individualized ambitions without feeling the restraining hand of altered conditions and altered attitudes. Group pressures, even when they have not yet been given the support of law, determine what each one of us can do, just as effectively in the field of business as in the every-day contacts of social living.

There is nothing new in this; the change has been going on for years. For centuries men have recognized the great strength of organization, its ability to accomplish by weight of numbers what could not be attained by any one acting alone. In the fields of economics, commerce, industry, labor, science and intellectual endeavor men have learned to know the value of coördinated effort, of mass movements, of coöperation for common purposes. Every modern industry worthy of the name has developed within itself

a sense of industrial solidarity, of a community of interests, and a willingness to relinquish small individual aims in favor of great gains for the group. Men of vision have seen the impossibility of achieving by individual effort what is so easily attainable by a show of strength, by ideas freely and generously exchanged, by policies candidly discussed, by personal contributions of thought, courage, desire and determination to a common fund. They have learned that they as individuals originate little, that the advances for which they feel inclined to claim credit are due in large measure to the accumulated knowledge of the entire group, and that, therefore, it is not unreasonable that they should contribute to that common stock of knowledge something that will add to its value and redound to their own benefit.

The need for organization among business men is greater to-day than it has ever been; it is great among the producers who comprise the industries we try to serve. On every side there is pressure exerted by organized groups. There are consumers who want better products at lower prices; workers who want higher wages and shorter hours; manufacturers who want to make more sales at higher prices; competitors who want wider markets and greater profits.

AND, above all these, in power, prestige and range of activities, stands political organization—the government—destined to play an increasingly important part as referee and guide, maker as well as interpreter of the rules. Too often it is looked upon as the most ominous threat facing business, quite as much because of its aloofness from, and supposed lack of sympathy for, the aims of business men as because of its power and the extent of its resources. Government can be, and sometimes has been, too arbitrary, too overbearing, too impatient in its handling of economic problems, but this has been due in large measure to the indifference of those very business men who had the most to lose through government action yet were unwilling to adopt the only method that can have any appreciable effect on government policy. Laws and administrative orders of various political bodies are usually the result of the influence exerted by pressure groups seeking protection for special interests. The ends the latter seek to attain are often prejudicial to, and even destructive of, the interests of others, who, because of their failure to organize, are powerless to oppose. Business men who neglect the opportunities provided for them by existing organizations overlook the only practical means available for defending them against the attacks of conflicting interests and for gaining the protection which they need. They can not justifiably criticize a government, whose activities are largely determined by the pressure exerted by industry groups, if they do not themselves utilize the tools that lie ready at hand.

Many of those who wail about present "conditions" withhold their support from their industry associations because of one or the other of two reasons. Some are so conscious of their large size, so proud of what they call their strength and influence, that they feel themselves above the need of organization help. Such men are in the minority, for usually the largest factors in an industry are the first to appreciate the advantages of united effort and the most generous in their financial and moral support. The majority of those who remain outside organization membership represent what has come to be known as "small business". They often seem to fear domination by their larger competitors or to believe that the ends sought are generally of greatest benefit to those competitors, who, because of their larger size, are already looked upon as well able to take care of themselves. The small business man is often afraid of contributing disproportionately to the attainment of gains in which he can not share as fully as others; yet in many organizations which do the most effective work for their members the dues are arranged in a way designed to make contributions bear a fairly definite relation to benefits.

WE can not name a single worth-while trade association which can not point to accomplishments of definite financial value to its members. Such organizations have successfully opposed unwarranted increases in freight rates; they have made elaborate presentations of facts to government bureaus on questions of vital importance to producers, such as hours and wages and the seasonal nature of their industries; they have exerted great influence in the writing of specifications covering the use of the materials produced by their industries; they have acted as clearing houses for information of great value to their members in such matters as taxation, restrictive legislation affecting competition, and the like. The cost of operating some of these organizations does not even approach the money value of their accomplishments. They are conducted on principles that are considered indispensable by business men everywhere and have called into their service men of outstanding fitness, training and integrity. In the places where their influence can be effective they command the respect and earn the sympathetic understanding which the members they represent so badly need.

Prudent business men in planning for the future financial security of their families utilize the facilities of trust companies, insurance companies and other groups representing the highest type of organized coöperative effort. Yet they often neglect to provide for the future security of the very businesses on which their descendants may principally depend. With competent, strong and well-organized trade associations available to help in the safeguarding of that future, the judgment of business men who fail to take advantage of their aid can be seriously questioned by those they leave behind.

1939 in Review

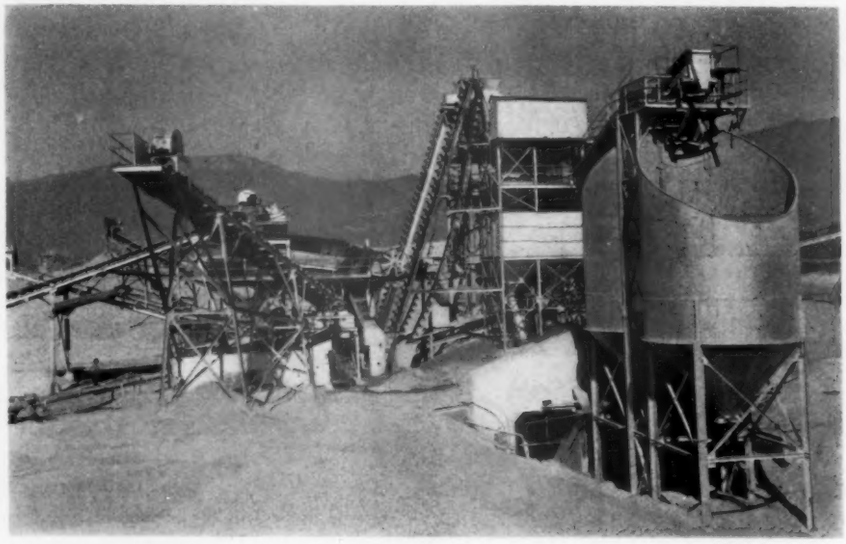
SAND AND GRAVEL

THE sand-and-gravel industry, judging from the expenditures made in 1939 for new plants and for improvements to existing plants, is not letting a few wars dull its optimism about the future. Producers in this industry have been and are now spending more money on their operations than at any time in nearly ten years. Again no extremely large new commercial plants were built, but many medium- and small-size plants were put in operation to supply comparatively small areas. The only really large plant of the year is being built to supply aggregates for the construction of a large dam. Hundreds of producers made improvements to existing plants to increase their efficiency and output and to lower production processing and delivery costs.

The incomplete information available at this time indicates that commercial production of sand and gravel in 1939 will exceed that of 1938 by from 10 to 15 per cent. As the 1938 volume was only 4 per cent. under that of 1937, which was the best year since 1929, the year 1939 apparently set a new high. A continuation of this upward swing is expected, at least for the first half of 1940. Favorable indicators include the high rate of industrial production and the increase in construction volume, especially of private residential and non-residential buildings. The new W. P. A. law passed by the Congress in 1939 is also expected to improve conditions by restricting to some extent the competition from government-operated plants. Prices in general were firm during the year, with a few notable exceptions, and the total value of production should equal or exceed that for 1937, the best previous recent year.

Memphis, Tennessee set the pace for the commercial sand-and-gravel industry in 1939 with two outstanding new commercial plants. Although located within sight of each other, these plants differ greatly in design. Both are dredging operations but there the resemblance ends. Both replaced existing plants.

The new plant of the Missouri Portland Cement Company is unquestionably one of the show-places of the sand-and-gravel industry. The entire plant and all connected operations show the results of careful planning and it has the neat and attractive appearance which somehow seems to be inseparable from sound engineering.



The new El Monte, California, plant of Graham Brothers, Inc. A feature is the combination of bin and stock-pile storage.

The surge stock-pile which has materially increased the output of the Irwindale, California, plant of Consolidated Rock Products, Inc.

The deposit is covered with layers of silt and sand, which are removed by a dredge with a Morris revolving cutter head and a 15-inch Ellis pump driven by a 425-hp. Busch-Sulzer Diesel Engine. This material is being used to fill in low ground.

The sand and gravel are excavated by another dredge with a 12-inch Morris pump and a 65-foot Eagle Swintek ladder. The dredge-line discharge overflows a box over a stationary screen which removes the sand. About half the sand is wasted, the remainder going into a box which settles out most of it and feeds two Eagle screw-washers in tandem. The dewatered sand is then carried on a conveyor with the gravel. A series of conveyors allow feeding direct to the plant or to a ground storage bin with a live-storage capacity of 1,200 tons from which a tunnel conveyor feeds back into the system.

The portable plant of F. G. Cheney, Williamston, Michigan, preparing highway-maintenance gravel.

In the main building the material is discharged over stationary washing screens, which divert the sand to a series of three settling boxes. Eagle screw-washers further dewater the products of each box before they go into storage bins. Gravel passes from the screens into a 6-foot by 24-foot Allis-Chalmers revolving screen which does all the sizing. The oversize goes to a Telsmith gyratory crusher in closed circuit. The products of this screen drop into eight concrete storage silos. Belt-conveyors feed these materials singly or in any desired blend to the top of the loading building. Here the aggregates are discharged into six concrete silos holding 350 tons each. Trucks are loaded under the bins. On one side arrangements are made for loading cars on a 50-foot Howe track scale. On the other side are two Butler bins and batchers for dry-batching or truck-mixer loading.

The new plant of the Wolf River Sand & Gravel Company, a sudsidiary of the Marquette Cement Manufacturing Company, is also located in the Wolf River bottoms. The deposit is also high in sand but in this operation the overburden is caved in with the material in dredging. The plant has an hourly capacity of 75 tons of gravel and 50 tons of sand, the latter being only a fraction of the amount of sand actually dredged.

The dredge is equipped with a 12-inch Pettibone-Mulliken dredge pump and a 65-foot Diamond ladder. The dredge line discharges into a box from which the material overflows on a gravity screen and through a trough which wastes about half the sand. The sand retained goes to a sand drag and is then carried on a conveyor to a raw-storage pile. Gravel goes to two McLanahan dual log-washers and on the same conveyor to the raw-storage pile which has a live storage capacity of 1,200 tons to a tunnel belt-conveyor.

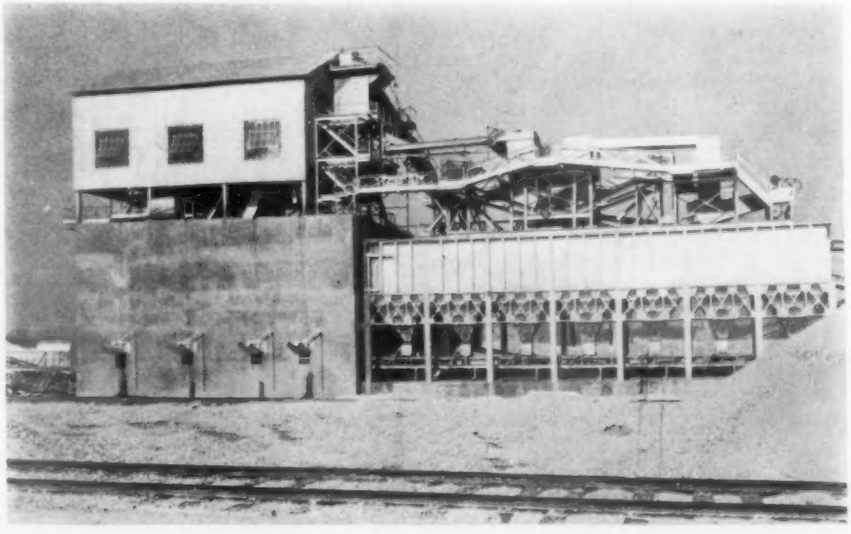
This conveyor discharges the material on a Symons 3-deck screen, the oversize gravel going to a Traylor 2-inch gyratory crusher. A belt-conveyor carries the crushed gravel with the gravel retained on the two lower decks of the screen to the top of the Kern radial tower storage system. Here another Symons 3-deck screen does the final gravel sizing, each size going to a separate compartment.

The sand passing through the bottom deck of the first Symons screen goes to two Eagle screw-washers in series. The dewatered sand is discharged on a belt-conveyor paralleling the gravel conveyor. A cross shuttle belt-conveyor discharges the sand into either of two radial storage compartments.

The tower storage system has a live-storage capacity of 600 tons and a total capacity of 70,000 tons. A 1½-cubic yard Sauerman Crescent scraper operated by a crawler crane is used. The belt-conveyor from the storage system can discharge either direct or by means of a shuttle conveyor into 7 bins for truck loading of separate sizes and dry-batched aggregates and for truck-mixer charging. As this plant produces only concrete sand a separate small dredge with a 6-inch Fairbanks Morse sand pump has been installed to reclaim sand from old waste piles. This sand goes through settling boxes which produce masons' sand and an extra fine special mortar sand.

In this same area a plant was built for the Shelby County Commission at the Shelby County Penal Farm near Memphis. This plant has a capacity of 200 tons per hour and was designed and equipped by the Link-Belt Company. The plant is located on a levee between an artificial pond or gravel bed and a swamp. A dredge of unusual design is used which is equipped with a 10-inch pump, agitator, etc. A steel-lined wooden mixing chamber receives the dredge line discharge. Plant equipment consists of a 48-inch by 18-foot trommel screen with a 14-foot sand jacket, a 20-inch diameter double-paddle type gravel washer, a double-deck vibrating screen, and a sand-dewatering screw. An 18-inch by 194-foot belt conveyor carries the sand to a bin. Two 18-inch by 166-foot conveyors carry gravel to bins.

The outstanding new sand-and-gravel plant of the year is nearing completion at Redding, California. The Columbia Construction Company secured the con-



The main building of the new plant of the Missouri Portland Cement Company at Memphis. Sand-classification equipment is at the right.

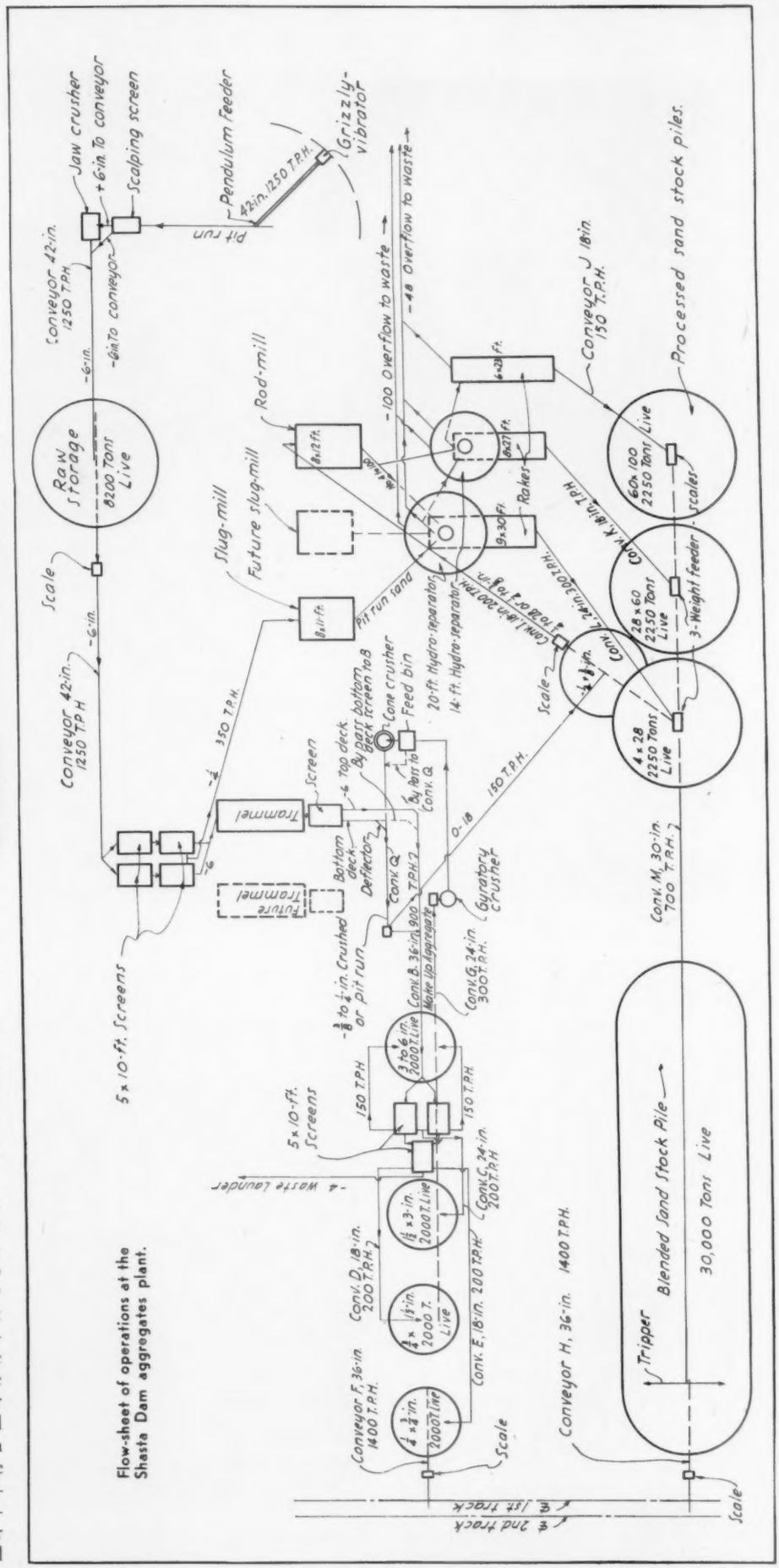
tract for 10,400,000 tons of sand and crushed gravel to be used in the construction of Shasta Dam and built this 1,000-ton per hour plant to meet the demand. Detailed descriptions of this plant (*P&Q*, November, 1939, page 44) and of the 9.6-mile conveyor system to the dam (*P&Q*, December, 1939, page 28) have been published.

The material is excavated from a dry river bed by 5-cubic yard and 8-cubic yard Bucyrus-Monighan drag-lines to the hopper of a pendulum conveyor followed by a field conveyor. A Selectro scalping screen and a Farrel-Bacon jaw crusher discharge minus 6-inch material on a conveyor to a raw-storage pile which has a live capacity of 8,200 tons. This material is reclaimed on a tunnel belt-conveyor, and a Merrick Weightometer keeps a record of the feed to the plant. Two pairs of Tyler Ty-Rock screens remove all the sand from the gravel.

The concrete silos for truck loading at the Missouri Portland Cement Company plant.

Sand goes into an 8-foot by 11-foot Allis-Chalmers ball-mill loaded with washers, which breaks up all the foreign matter. A Dorr classifier, with a 20-foot bowl and a 30-foot rake, wastes all the 100-mesh and most of the 48-mesh material, including most of the foreign matter. The 4- to 28-mesh sand-rake product goes to a storage pile.

The gravel from the above screens goes into a Hendy revolving scrubber screen. A Ty-Rock screen removes ¼- to ⅜-inch material which is conveyed to a pile from which a tunnel conveyor with a Merrick Weightometer feeds it to an 8- by 12-foot Marcy open-end rod-mill. The product of this mill can be split in any desired proportion to the above classifier or to a second Dorr classifier with a 14-foot diameter bowl and a 27-foot rake. The 28- to 60-mesh rake product is conveyed to a storage pile. Some of the rake overflow, 60- to 100-mesh, is conveyed to a third sand-storage pile. A single tunnel conveyor under these piles is fed with material



Flow-sheet of operations at the Shasta Dam aggregates plant.

by Merrick Feedoweights in any desired proportions, and the blended sand goes to a stock-pile with a live-storage capacity of 30,000 tons. A tunnel belt-conveyor loads out sand for shipment at the rate of 1,400 tons per hour. This conveyor is also equipped with a Merrick Weightometer.

The minus 6-inch gravel is conveyed to a pair of Tyler Ty-Rock screens and their 3- to 6-inch and 1½- to 3-inch products are discharged by gravity to stock-piles. A second pair of screens produce ¾- to 1½-inch and ¼- to ¾-inch gravel and these, too, are conveyed to stock-piles. In a tunnel under these stock-piles is a belt-conveyor, which can return any size for recrushing, and a loading conveyor. The latter conveyor

One of the two gearless gyratory crushers in the plant of the Lock Joint Pipe Company.

has a capacity of 1,400 tons per hour and a Merrick Weightometer records shipments.

The 9.6 mile belt-conveyor system, which will carry aggregates to the dam site, will be in 26 sections. Goodyear 36-inch belting and Chain Belt idlers are used. The conveyor will have a capacity of 1,100 tons per hour and, operating at a speed of 550 feet per minute, material will be on this system for one hour and 40 minutes.

Another outstanding new plant was that of Graham Brothers at El Monte, California, which replaced a plant which was built in 1929 and had become obsolete. The capacity of both plants was 200 tons per hour. The new plant is built entirely of concrete and steel and has many original features of design and operation. As in many other plants in this area, the gravel and crushed gravel are processed separately.

The deposit is a dry river bed and is excavated with a 12-cubic yard Le Tourneau Carryall and an Emsco

New plant of the Myers Gravel & Sand Company, Anderson, Indiana, showing cableway scraper bucket dumping over grizzly into hopper.

scraper of the same size. They are drawn by Caterpillar RD 8 Diesel tractors and discharge their loads to an 80-ton steel hopper. A Jeffrey-Traylor vibrating feeder serves a 140-foot belt-conveyor leading to a Link-Belt vibrating scalping screen. Material passing through this screen is conveyed to a 24-foot revolving screen. Coarse gravel from this screen can be fed to a Symons cone secondary crusher or conveyed to a stock-pile from which it can be re-run for crushed rock. Sand goes to a reciprocating drag-washer from which a series of conveyors carry it to a stock-pile. After it has been thoroughly drained a tractor and bulldozer move the sand over a steel tunnel for truck loading. All the other products of the revolving screen are elevated to two Symons screens in series and the various sizes go to storage.

The gravel retained on the scalping screen goes to a Telsmith crusher and is then conveyed to a Symons screen. The oversize goes to the 4-foot Symons cone crusher or the stock-piling conveyor already described. The product of the crusher is returned to either of the two belts following the scalping screen. Intermediate-sizes of gravel from the sizing screen can go with the oversize gravel or can be elevated with the finer gravel from this screen to a Symons screen followed by a Robins Gyrex screen. These do the final sizing of the crushed gravel, the products going to the bins or being conveyed to a Simplicity screen which makes special sizes. The products of this screen go to a pair of conical-bottom steel bins for truck loading.

The main bin structure consists of 8

A view of the yard of the River Sand & Gravel Company, Owensboro, Kentucky, showing the new all-steel sand-conveying system and concrete-stave silos.

square steel bins, 4 under the gravel and 4 under the crushed-gravel screens. These have a total capacity of 465 tons. Under these bins is a 2-lane concrete truck-loading tunnel over which an additional 500 tons of material in four sizes can be stored. The eight bins discharge through pipes and the four piles direct to separate gates in the tunnel. In case of high water, which would inundate the pit and loading tunnel, the plant can be operated from the stockpiles of raw material and the finished sizes can be loaded direct to trucks from the steel bins.

On the same Central Valley Project but hundreds of miles farther south the Bent Brothers-Griffith Company is

The slack-line cableway-scraper system used by the Pacific Rock & Gravel Company, Monrovia, California.

building a plant to supply aggregates for Friant Dam. This plant is being designed by the Stephens-Adamson Manufacturing Company, which will supply all the equipment. A feature of this plant will be a single belt-conveyor several miles long from the pit to the dam site.

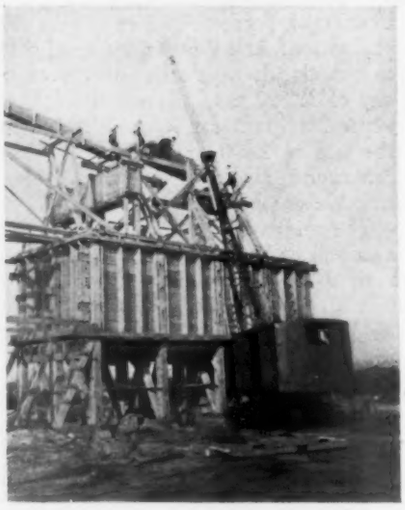
The Tennessee Valley Authority has also been active and a plant is now being erected near Gilbertsville, Kentucky, to supply aggregates for the dam of that name. Much of the equipment is being brought from the Hiwassee Dam plant. The aggregates for the Watts Bar Dam will be supplied from a plant operated by the Birmingham Slag Company.

Another outstanding new plant was that of the Lincoln Sand and Gravel Company at Lincoln, Illinois, which began operation there in 1903 and has steadily enlarged and improved its operations since. The new plant, which went into operation early in 1939, was built around a Kern radial storage system and was designed by H. D. Clouse, superintendent. It has a capacity of about 350 tons per hour and can load cars at the rate of 800 tons per hour. The storage system has a capacity of 150,000 tons.

The overburden is removed by a Northwest drag-line with a Page bucket and two Koehring pneumatic-tired Dumptors. The dredge is equipped with a 10-inch Amsco pump and the pipeline discharges over a spreading table and stationary screens. Sand goes to a 14-foot diameter Simpicity dewatering wheel. A belt-conveyor feeds a shuttle conveyor which discharges the sand to storage. Fine gravel goes to a Robins Gyrex screen for sand removal. Coarse gravel goes to another Robins Gyrex screen followed by a 2-foot Symons cone crusher. All the gravel is carried on another conveyor to the top of the Kern tower, where final sizing is done by a Simplicity screen followed by a Robins Eliptex screen.

The tower has 6 compartments with a free-flowing capacity of 3 carloads each. A Marion crane at present operates the 1-cubic yard Iowa Manufacturing Company scraper bucket. Aggregates can be blended or discharged singly on a belt-conveyor to the loading tower from which cars are loaded on two tracks.

The Lock Joint Pipe Company has a contract to supply concrete pressure pipe up to 150 inches in diameter for the 15-mile extension to the Wachusette Aqueduct, which will carry water to the metropolitan area of Boston. Such large quantities of aggregates were required for this pipe that a sand-and-gravel plant with a capacity of 125 cubic yards per hour was built. Designed by the Kennedy-Van Saun Manufacturing & Engineering Company, which also supplied all the equipment, this plant went into operation in April, 1929.



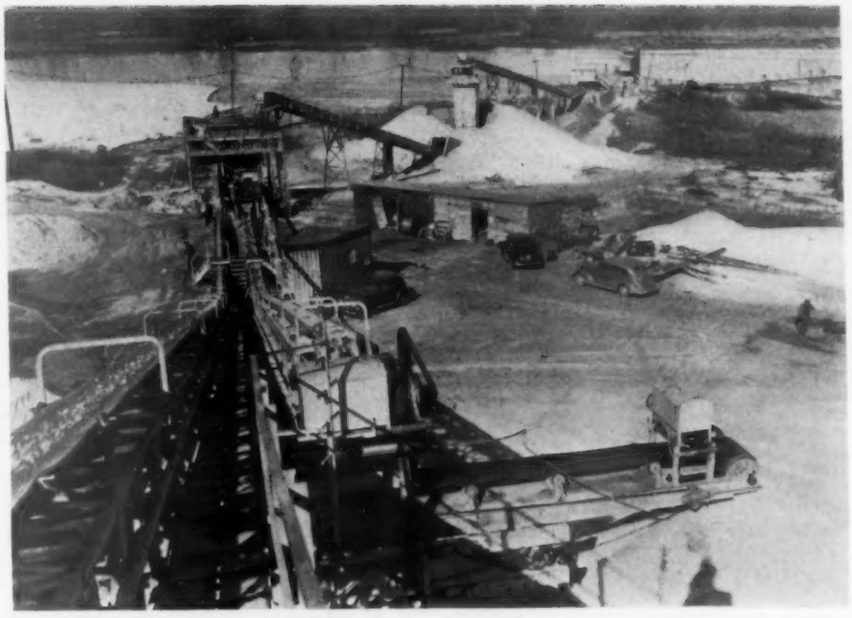
The new plant of C. S. Barlow & Sons, Inc., Tacoma, under construction.

A Northwest shovel loads the gravel into trucks which discharge from a ramp over a grizzly into a hopper feeding a Kennedy vibrating screen. The oversize goes to a No. 12 Kennedy gyratory crusher and all the materials are combined on a belt-conveyor to a second Kennedy screen. A hopper and belt-feeder control the rate of feed of the uncrushed material to this belt and even out the flow of material. Coarse material is again reduced, by a No. 25½ Kennedy crusher. Gravel is stock-piled by a conveyor. Sand goes to a Kennedy 8-foot diameter washing classifier and the product is discharged on a dewatering belt-conveyor which is troughed at the feed end, flattens out near the center, and becomes convex at its discharge end. This gradual tapering allows water to drain from the sand with little spillage and reduces the moisture content of the sand from 14 to 18 per cent. down to about 5 per cent. *(P&Q,* October, 1939, page 40.)

The new plant of the Lincoln Sand & Gravel Company at Lincoln, Illinois, with the radial-tower system of storage in the foreground.

The McGrath Sand & Gravel Company built a new plant near Bloomington, Illinois, with a capacity of over 150 cubic yards per hour. Stripping is done with a 12-cubic yard Le Tourneau Carryall scraper and an RD 8 Caterpillar Diesel tractor. Material is excavated and fed to the plant by a 1½-cubic yard Sauerman Crescent scraper on a Sauerman slack-line cableway. A Nordberg Symons screen is used to scalp the oversize to an Allis-Chalmers gyratory crusher. Gravel sizing is done by three Simplicity vibrating screens, and the sand goes to a pair of Link-Belt Shaw classifiers. Four conical-bottom steel bins, which have a combined capacity of over 1,000 tons, are used. Cars can be loaded from one side and trucks from the other. If desired, several sizes can be blended on a belt-conveyor under the bins to a hopper under which is a Simplicity rinsing screen.

The Palm Springs Builder's Supply Company, Palm Springs, California built a new plant to supply aggregates for that well-known desert resort. A drag scraper feeds material on a bar grizzly and oversize is reduced by a crusher. A reciprocating plate feeder serves a belt conveyor to a second crusher the product of which is elevated to a vibrating screen. Sand goes to a washer and then to a bin or by conveyor to a stockpile. Oversize is returned to the secondary crusher. Gravel goes either into a bin or to a stock-piling conveyor. The Stephens-Adamson Manufacturing Company designed this plant and supplied all equipment.



The new plant of the Wolf River Sand & Gravel Company, Memphis, viewed from the radial-storage tower.

The new portable washing-and-crushing plant of Jay Estey at Springfield, Ohio, which supplements a stationary plant at Troy, Ohio.

A new plant was built in 1939 by the Myers Gravel & Sand Company, Anderson, Indiana, which has been in business there since 1922. Material is excavated by a Sauerman slack-line cable way excavator system with a 1-cubic yard bucket. The plant hopper has an inclined grizzly and all the "throughs" are chuted to a 3-deck Simplicity screen. A Universal jaw crusher reduces the oversize gravel, and its product goes to a separate bin for truck loading. Coarse gravel goes to bins and fines to a Deister Concentrator Co. Leahy screen. Sand is dewatered in a cone tank. *(P&Q,* October, 1939, page 39.)

A small new plant was completed early in 1939 by Lofts & Son, Hood River, Oregon. Gravel is excavated with a clam-shell dredge from the Columbia River at a point near the upstream end of Lake Bonneville. A 100-cubic yard barge is used to carry the material to the shore, where it is dumped in shallow water beside the plant. A stiff-leg clam-shell derrick is used to pick up this material and feed it to the plant. The equipment in the plant consists of two Simplicity screens and a Wheeling jaw crusher.

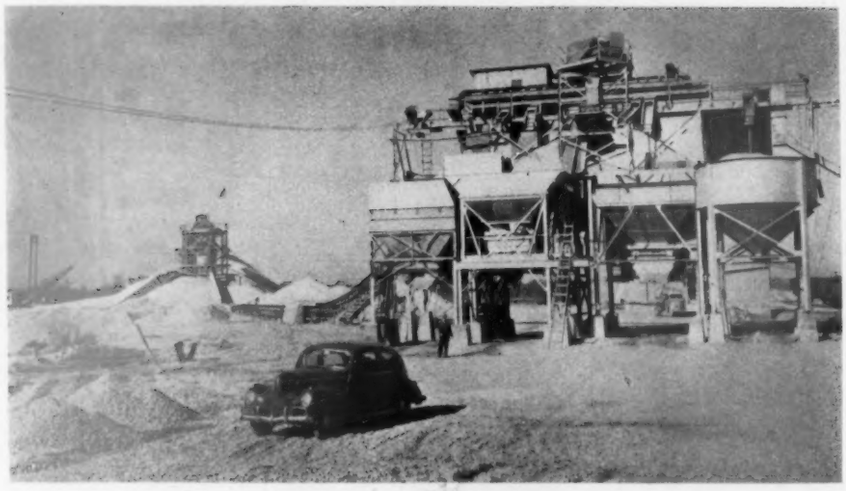
The Hubbs Building Material Company, Colton, California, built a new plant, its equipment supplied by the Brown-Bevis Equipment Company, Los Angeles. There are a Symons screen and Butler steel bins.

The Crystal Concrete Corporation, Braintree, Massachusetts, built a new plant to serve the Boston area. The equipment supplied for this plant by the Smith Engineering Works includes Size 13 B and 8 B crushers, a 24-inch feeder, a 4-foot by 10-foot three-deck Pulsator screen, two No. 8 sand tanks and a No. 7 tank.

The Rock Island Sand & Gravel Company, Rock Island, Illinois, has its new "Green Lakes" plant near Milan practically completed. The concrete bins are ready and most of the equipment has been installed.

The Becker County Sand & Gravel Company built a new $75,000 gravel

The sand-drainage conveyor in the plant of the Lock Joint Pipe Company.



The bins used for loading out various sizes and combinations of sizes of gravel at the Wolf River Sand & Gravel Company's new plant.

plant at Lugoff, South Carolina, to supply nearly 400,000 cubic yards of sand and gravel for the Santee-Cooper Dam. The plant has a capacity of 25 cars of material daily. Commercial demand in this area will also be served. Included in the equipment is an Eagle screw sand-washer and a double-paddle log-washer.

Jay Estey, Springfield, Ohio, has for some years operated a stationary commercial gravel washing and crushing plant at Troy, Ohio. This year a considerable demand arose outside the area served by this plant and an Austin-Western No. 125 combination portable washing-and-crushing plant was purchased to meet it. This plant operated all summer near Springfield.

McElwee & Rogy, Inc., built a new plant at Chillicothe, Illinois, which has a capacity of 600 tons daily.

The Grant-Pacific Rock Company built a new plant near Lindsay, California, at a cost of about $75,000. This replaced an old plant at Lemon Cove, which is being dismantled.

A new plant was built late in 1939 by C. S. Barlow & Sons, Inc., Tacoma, Washington, a pioneer building-material dealer and ready-mixed-concrete producer. This plant is the company's first venture into aggregate production and has a capacity of 50 cubic yards per hour. A crane and clam-shell bucket are being used for excavating to a movable hopper, from which a Webster reciprocating feeder discharges the material on the 246-foot main conveyor. A Webster Gilbert-type screen removes the gravel over 3 inches in size to a stock-pile. Later a crusher will be installed to reduce this material. The material passing through the scalping screen is flumed to a Webster cylindrical sizing screen with a sand jacket. The various sizes of gravel and sand can be discharged to either storage bins or stock-piles. U. S. conveyor belting and Timken-bearing idlers are used. A Koehring gasoline crane will rehandle stock-piled material for shipment and to a Blaw-Knox batching plant for truck-mixer loading.

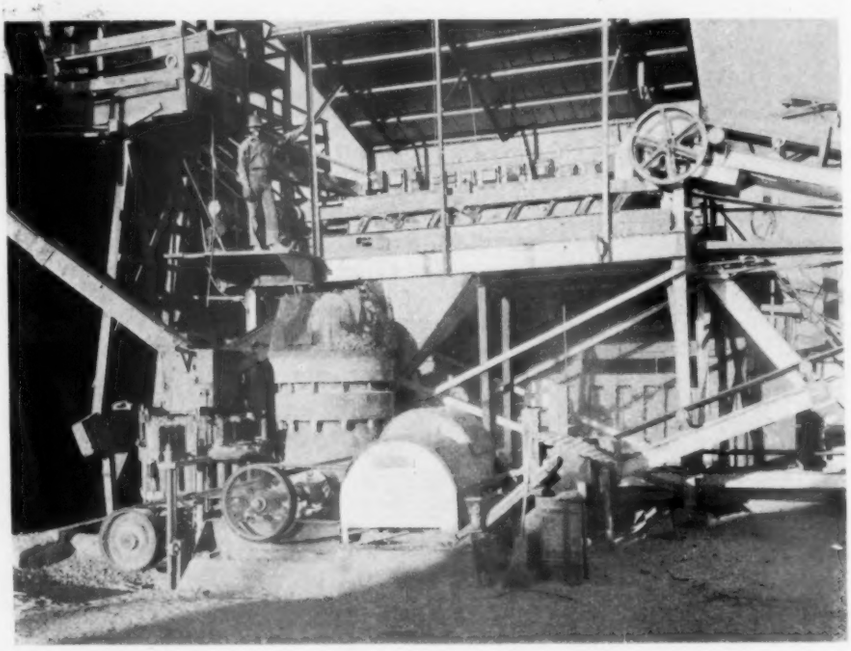
The Central Sand & Gravel Company, Iowa City, Iowa, built a new plant. A 10-inch Amsco dredge pump and Telsmith screens were installed. The C. G. DeBolt Company, Richmond, Indiana, also built a new plant.

Some of the most interesting developments in this industry and in others related to it have been in the delivery equipment. In this, as in many other things, the lead was taken by Pacific Coast producers who were the first to take advantage of the economies of Diesel-powered trucks. Producers in other sections were not far behind and hundreds of Diesel trucks are now used in this field, the largest fleet being that of the Colonial Sand & Stone Company, New York, which now numbers over 150 trucks powered by Cummins and Mack engines. The runner-up position probably belongs to the Consolidated Rock Products Company, Los Angeles, California, which during the past two years bought 42 new Diesel-powered trucks and converted 34 to Diesel power. Out of its fleet of over 150 trucks 76 are now Diesel-powered. Cummins, Hercules and Buda engines

The electric vibrating feeder under the pit hopper at the new Graham Brothers plant.

are used. Substantial economies have already been realized.

The Blue Diamond Corporation, also of Los Angeles, lowered its delivery costs in an entirely different manner. This concern has a fleet of 66 trucks exclusive of 6 new ready-mixed-concrete trucks. Of these, 25 are Mack AC trucks, each of which with its trailer hauls a pay-load of 20 tons. Twenty are Internationals and 6 are Reos, all



The compact crushing and screening arrangement at the Roscoe, California, plant of Graham Brothers, Inc.

Two of the vibrating screens on the rebuilt dredge of the Keystone Sand Division.

hauling 10 tons each. An additional 15 Reo flat trucks are used for miscellaneous deliveries. The Mack trucks are all over 10 years old and the others are 6 to 7 years old.

Experimentally the compression ratios of several of the Mack trucks were raised from 4.2 to 5.7 and ethyl gasoline of 84.5 octane rating was used in place of the 72-octane gasoline formerly bought. The results obtained were so remarkable that 8 Macks and 2 Internationals have already been converted and others are to follow. This change increased the power of the trucks 25 per cent. and effected a fuel saving of 13 per cent. As the saving in fuel is just

One of the four plants improved by the Arundel Corporation, Baltimore.

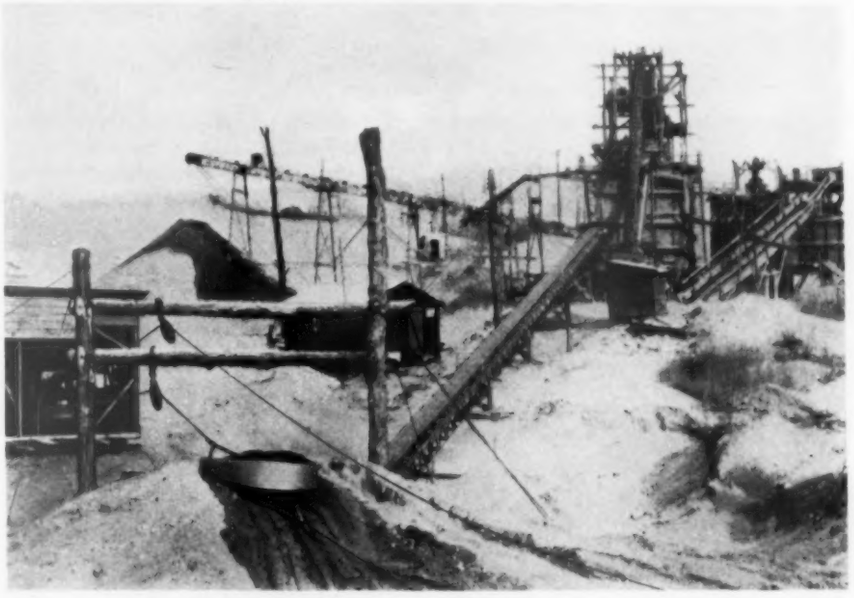
about balanced by the premium price paid for ethyl gasoline the improvement in performance is the principal benefit. The mileage per gallon of fuel of the old Mack truck-and-trailer units, hauling 20-ton pay-loads, has been increased from 2.8 to 4.5 miles per gallon and on the more recent overhaul jobs 5 miles are being obtained. It is expected that even higher compression ratios will be tried. The improved performance of these trucks has cut delivery time 17 per cent.

Compression was increased in the Mack trucks by shaving down the cylinder heads. High-dome pistons were put in the International truck engines. The Mack truck engines were designed for a top speed of 1,600 r.p.m. and their crank-shafts are to be counterbalanced to eliminate vibration and allow full advantage to be taken of the improved performance. This company also operates a Mack AC truck and trailer with a Hall-Scott Diesel engine and an average of 7½ miles per gallon is being obtained with a 20-ton pay-load.

Butane gas, a waste product of oil refineries, has been used in California for some years by long-distance truckers and some aggregate producers have also experimented with it. One of the first seriously to adopt this fuel was the S. H. Bacon Materials Company, Los Angeles, California, a producer of ready-mixed concrete and a building-material dealer. This company operates a fleet of 10 trucks and has found that the use of butane gas increased the power 15 per cent. over that obtained from gasoline and cut fuel costs 40 per cent. Changing over to this fuel was completed a few months ago and necessitated only a special carburetor and fuel tank, for each machine.

The Pacific Rock & Gravel Company, Monrovia, California, replaced its shovel and field belt-conveyors with a Sauerman slack-line cable-way system operating an 8-cubic yard Crescent scraper. Material is scraped from the pit and the bucket is returned by gravity. The system is operated from a 137-foot steel tower and has a 1,000-foot span. The scraper piles the material over a concrete tunnel to a height of 60 feet, giving a live-storage capacity through the tunnel of 3,000 tons. A new 630-foot belt-conveyor carries the material to a surge hopper near the plant, which formerly received the discharge of the pit conveyor system.

The Consolidated Rock Products Company made changes in its pit operations at Irwindale, California, which have increased the plant capacity considerably. Formerly a series of belt-conveyors carried material from the pit to the plant, which was limited in output by the 400-ton per hour capacity of the shovel. A stock-pile was built between the field conveyor and the main conveyor, which makes the pit and plant independent of each other. Now material can be fed to the plant fast enough to keep it operating at its capacity of over 500 tons per hour.



The 3-cubic yard scraper which replaced a 1½-cubic yard scraper at the Worden Sand & Gravel Company's plant.

At the company's Roscoe plant a 200-foot steel truck-loading tunnel was installed for the storing of wet concrete sand. This system gives the sand ample

The improved plant of L. D. Everist, Inc., at Lanesboro, Iowa.

The new river sand-and-gravel plant of the Longview Concrete Pipe Company at Longview, Washington.

One of the new crushers installed on the dredge of the Richmond Sand & Gravel Company.

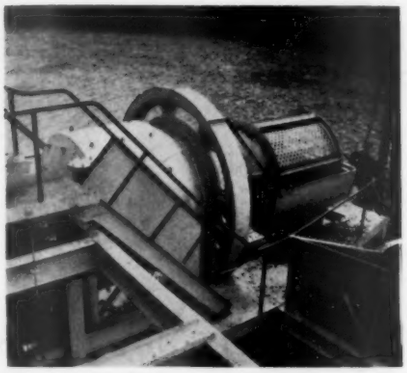
opportunity to drain without necessitating expensive rehandling.

The Keystone Sand Division of the Dravo Corporation, Pittsburgh, Pennsylvania, completely revamped its Dredge No. 9 and expended $250,000 for new equipment. This was done in order to be able to produce any sand and gravel which might be called for by specifications. Because so much new machinery was required, the hull of the dredge was enlarged. No change was made in the digging ladder and mechanism, but considerable new processing equipment was installed. This included a new vibrating scalping screen, 5 new vibrating sizing screens, 2 rotary scrubbers, an adjustable impact crusher, 4 new belt-conveyors, hoppers for classifying and remixing materials, and two 3-drum warping engines. All the equipment is electric-motor-driven, 13 large motors being required.

Among the equipment installed was a 7-foot by 48-inch Hardinge conical scrubber with a trommel which is fed sand and gravel containing coal and tenacious clay. Allis-Chalmers Low Head screens were also installed. Increased generating capacity was required for this extra load. The new power plant consists of two Cooper-Bessemer Diesel engines direct-connected to Elliott Corporation variable-speed, direct-current generators with outputs of 140 to 200 kilowatts each. The dredge has a capacity of 400 to 500 tons per hour.

The Florida Gravel Company, Chattahoochee, Florida, purchased an American locomotive crane with an 85-hp. Cummins Diesel engine. An International 100-hp. Diesel engine was installed in a tug-boat.

Improvements were made during 1939 to the operations of the River Sand & Gravel Company, Owensboro, Kentucky, which have greatly increased their efficiency. An Eagle Swintek screen-nozzle ladder on the dredge has increased its capacity considerably. Screening is done on the dredge and a tow-boat powered by a 240-hp. Fairbanks-Morse Diesel engine hauls barge-loads to the plant. A Wiley Whirley electric crane transfers the materials to Butler truck-loading bins or to a Butler hopper. From the latter a conveyor extends to a tower, from which cable-controlled dump cars on two trestles can discharge to open storage. A pivoted Barber-Greene belt-conveyor can discharge into either of 2 Marietta concrete-stave storage silos with a capacity of 350 tons each. Trucks are loaded from these silos. Sand is stored by a new Robins all-steel conveying system consisting of a 160-foot belt feeding a 50-foot shuttle conveyor with a tripper.



The 7-foot by 48-inch Hardinge conical scrubber installed on the Keystone dredge.

Four Barber-Greene loaders are used to load gravel and sand from stock-piles. (*P&Q*, December, 1939, page 37.)

The American Aggregates Corporation improved its operations at Columbus, Ohio, by the installation of a tunnel storage and reclaiming system for sand and the removal of sand classification from the main plant. All the sand is now brought by an 8-inch Amsco pump to equipment located over the storage. A double-deck Simplicity screen diverts two coarse sand fractions to separate storage compartments. Two sand drags remove material from 28-mesh down to 50-mesh. The overflow goes to a settling tank which produces two fine fractions. In loading out on the tunnel belt-conveyor any desired blend of sand can be obtained. Three sizes of gravel are also stored over this tunnel. Provisions are made for re-washing the reclaimed aggregates over a Simplicity screen.

The corporation also remodeled sev-

The new dredge and plant of the Shelby County Commission at the Shelby County Penal Farm near Memphis.

eral of its sand-and-gravel plants during the year. Considerable new equipment was installed, including Smith Engineering Works crushers and screens.

The Richmond Sand & Gravel Company, Richmond, Virginia, installed a Telsmith 13B gyratory crusher and two No. 26 Telsmith Gyrasphere crushers on its dredge near that city.

L. G. Everist, Inc., installed additional equipment to increase the capacity of its plant near Lanesboro, Iowa. This all-steel, sectional gravel washing-and-screening plant was built by the Diamond Iron Works and has a capacity of 150 cubic yards per hour. The new equipment includes a scrubber box, a 4-foot by 12-foot Symons screen, and a 15-foot double-screw Eagle gravel washer with a deshaler attachment.

Eagle Iron Works sand washers were also installed by the More Sand Company, Junction City, Kansas; the Indiana Gravel Company, Indianapolis, Indiana; the Modern Sand & Gravel Company, St. Louis, Missouri; the M. O. Weaver Construction Company, Elkader, Iowa; and the Bouska Construction Company, Protovin, Iowa.

The Charles England Gravel Company, Plainville, Indiana, is installing an 80-foot Eagle Swintek screen nozzle ladder on an 8-inch dredge. The Louisville Sand & Gravel Company, Louisville, Kentucky, is installing a 70-foot Swintek ladder on a 15-inch dredge.

Elmer Larson, Decatur, Illinois, purchased a 21-inch by 38-inch Austin-Western roller-bearing jaw crusher equipped with an apron feeder and a grizzly to be used ahead of a portable crushing-and-screening plant.

A 12-inch Morris dredge pump was installed by the Seminole Rock & Sand Company, Miami, Florida. The Norcross Sand & Gravel Company, Pemberton, New Jersey, installed an 8-inch Morris pump.

The two Diesel-generators on the rebuilt Keystone Sand Division dredge.

The Longview Concrete Pipe Co., Longview, Wash., has manufactured concrete pipe and products since 1922, has produced sand and gravel since 1926 and ready-mixed concrete since 1938. Late in 1939 a new sand and gravel plant was built. This consists of a hopper from which the material is fed to a revolving screen with a sand jacket. This produces plus 2-inch gravel for ballast and road-base and ¼- to 2-inch gravel. Concrete sand is produced through ¼-inch cloth and masons' sand through 10-mesh cloth. Some of the fine sand is added to the concrete sand. These products are discharged to four bins of 150 ton capacity each. There are also 3 bins for special sand and gravel shipped in from the Portland area. These bins are supported on piles and trucks are loaded in two passages under the bins.

Butane gas being loaded into tank of S. H. Bacon Company truck which can be converted for sand-and-gravel delivery.

The new dredge of the Eastwood Sand & Gravel Works, Grayville, Illinois. Two sizes can be loaded into barges simultaneously.

The new sand-drainage and truck-loading tunnel at the Roscoe, California, plant of the Consolidated Rock Products Company.

Nepheline Syenite . . . a New Mineral Which Is Competing with Feldspar

The Rochester processing plant of the American Nepheline Corporation.

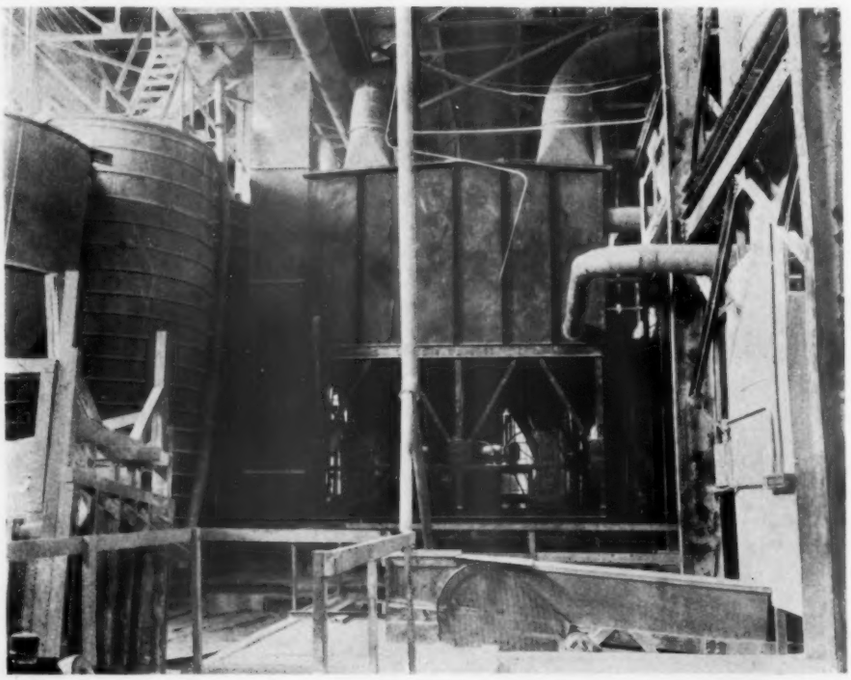
ONCE in a great while a new mineral and a use for it are discovered and a new industry is developed. This was the case with nepheline syenite, which can be used by manufacturers of glass, porcelain, pottery, tile, heavy clay products, enamel, etc. The largest known uniform deposit on Blue Mountain, 20 miles north of Lakefield, Ontario, is under the control of Canadian Nepheline, Ltd., which has proved over 1,000,000 tons of this material by diamond drilling.

Nepheline syenite is an igneous rock somewhat resembling granite in texture, hardness, and general appearance. The chief minerals comprising this rock are nepheline, potash feldspar, soda feldspar, with various accessory minerals. It contains little or no free quartz. This rock falls into the class of the sodium-aluminum-silicate group. The refined product has the following chemical analysis:

	Oxides	Percentage
Silica	SiO_2	60.000
Alumina	Al_2O_3	24.000
Iron	Fe_2O_3	.060
Titanium	TiO_2	.002
Calcium	CaO	.300
Magnesium	MgO	.020
Soda	Na_2O	10.000
Potash	K_2O	5.000
Ignition Loss		.420
Total		99.802

At first this material was processed in a plant at Lakefield, Ontario, from which the finished product was shipped throughout Canada and the United States. In 1937 a processing plant was built at Rochester, New York, by a subsidiary, the American Nepheline Corporation, to supply the demand in this country.

Trucks haul the material four miles to a dock on Stoney Lake, where it is discharged into barges. In order to eliminate the cost of rehandling the material from the trucks to the barges, an arrangement has been worked out whereby the trucks dump their loads directly into the barges. This is carried out by having a truck ramp, consisting of widths of timber to fit the size of the truck wheels, which extends to a pier located about 30 feet from the shore. An empty barge is placed under this ramp, between the pier and the shore. The trucks back out on the ramp and dump their loads between the wheel tracks into the barge. When one section of the barge is loaded in



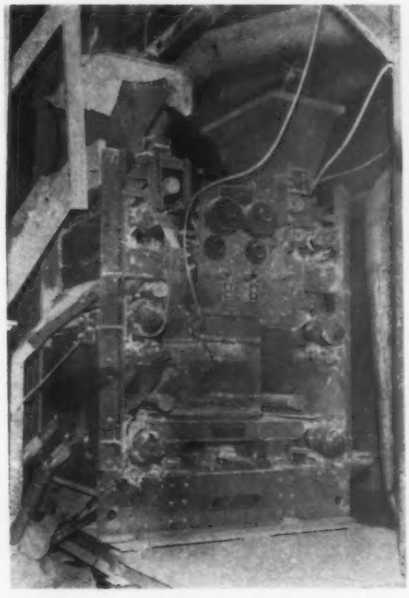
The dust-collector to which most of the plant equipment is connected. Elevator carries dust to storage tanks at left.

Quarrying is done by customary methods and the broken stone is carried by a Dempster Dumpster unit on a Ford truck to the crushing plant. The product of a crusher goes to a Niagara 4-foot by 8-foot double-deck screen with 1½-inch and ¼-inch cloth. The three sizes made are discharged into truck-loading bins. The plus 1½-inch material is shipped to the Rochester plant, the ¼- to 1½-inch material goes to the Lakefield plant, and the minus ¼-inch material is used for road surfacing.

The 8- by 36-inch conical mill used for the reduction of plus 20-mesh material.

this way, it is moved by hand so that the trucks may fill the other empty portions. Three 200-ton barges are used and these are hauled to Lakefield, a distance of 15 miles, by a steam towboat. The trucking is handled by a contractor using International and Studebaker dump trucks, which carry about 6 tons each. The barging equipment is owned by Canadian Nepheline, Limited.

At the Lakefield docks a 1½-cubic yard gasoline crane unloads the material to a stock-pile on the docks, or into gondola cars on the railroad siding.



The double magnetic separator which processes two sizes of material.

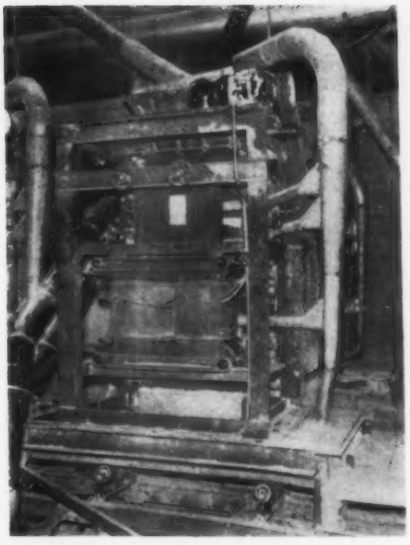
The material for the American plant, which is shipped in gondola cars, travels 50 miles by railway to Cobourg, Ontario, on Lake Ontario, where they are loaded on a car ferry. The cars are landed at the Genesee Dock at Rochester near the American Nepheline Corporation plant and are switched to the plant.

At the plant the nepheline-syenite rock (minus 4-inch) is discharged from the cars into a hopper from which a Link-Belt reciprocating feeder transfers it to a 24-inch by 50-foot inclined belt-conveyor supplying the 24-inch by 175-foot main conveyor. The latter is inclined for the first 112 feet of its length and extends horizontally over a 900-ton crude-material bin into which the rock is discharged by a Link-Belt tripper. Rock is withdrawn from this bin as needed in the plant through Jeffrey bin gates to a 24-inch by 50-foot belt-conveyor with a variable-speed drive. A Dings 18-inch by 24-inch magnetic pulley removes any tramp iron that may be present.

The rock is discharged from this conveyor into a 12-inch by 24-inch Reliance jaw crusher which is driven by a 60-horsepower General Electric synchronous motor. The minus ¾-inch crusher product is carried by a 50-foot elevator to a 2-foot by 6-foot Seco 1-deck vibrating screen equipped with Hendrick ¾-inch perforated plate. Oversize material is chuted back to the crusher. Material passing through this screen is discharged on a 16-inch by 160-foot horizontal belt-conveyor with a Link-Belt traveling tripper, which discharges the rock into the 1,200-ton storage bin in the mill. All the equipment from the crude-material storage bin on is connected to a Type 34 Sly dust-collector. The screen is inclosed in a dust-proof housing and the superstructure on the final storage bin is sealed against dust loss.

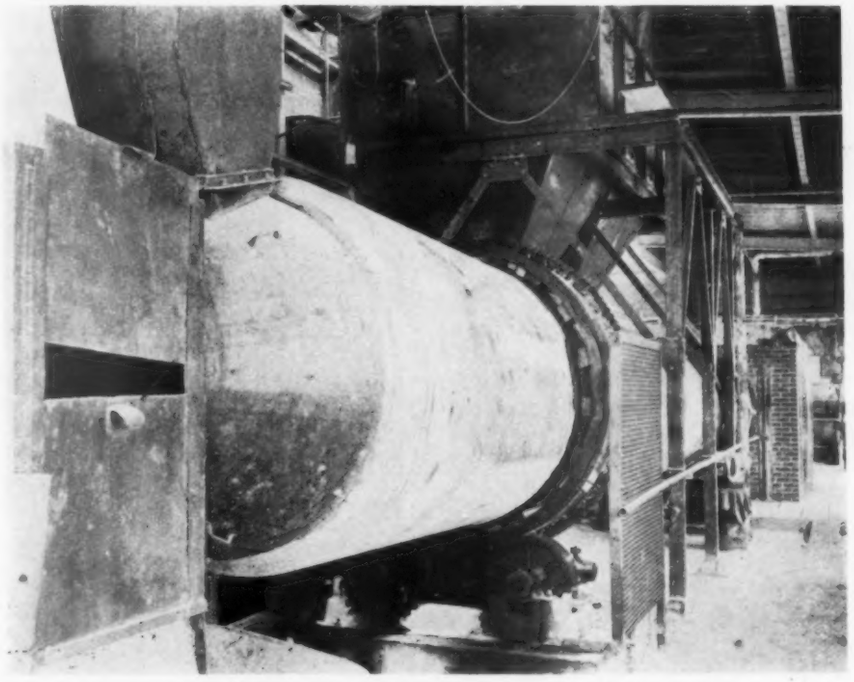
The rock is withdrawn from this bin through nine Jeffrey gates to an 18-inch by 186-foot belt-conveyor which inclines to discharge it into the Hardinge Ruggles-Coles 54-inch by 35-foot Type XF4 direct-fired counter-flow rotary drier. This is fired with coke through an arched brick furnace. Gases are exhausted from the drier through a Model 20 Sirocco collector by a No. 17 Clarage fan followed by two Sly Type 34 dust-collectors.

The dried nepheline-syenite rock is carried by a 67-foot elevator to a pair of 4-foot by 10-foot Type 38 Tyler Hum-mer double-deck screens. These are equipped with 8-mesh and 20-mesh cloth on their top and bottom decks, respectively. The minus 20-mesh material is a milled product ready for magnetic separation. The plus 8-mesh material is chuted to a 32-foot elevator



One of the four single magnetic separators used in this plant.

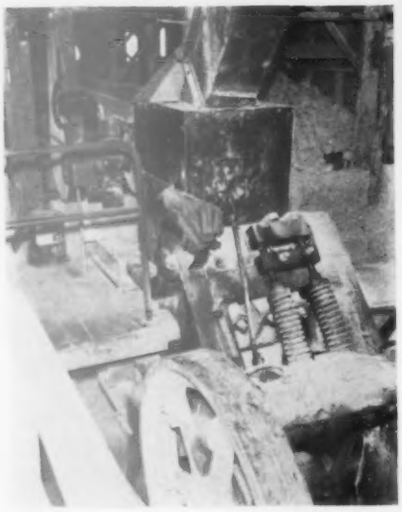
which discharges it into a 125-ton tank. A Jeffrey gate feeds it to a 20-inch by 16-foot belt-conveyor serving a 16-inch by 36-inch Traylor roll-crusher. The crusher product is returned to the elevator feeding these screens. The 8- to 20-mesh material from these screens is chuted into a 125-ton bin. A Hardinge Size B constant-weight feeder controls the feed from this bin to a 60-foot bucket-elevator followed by a 20-inch by 36-foot belt-conveyor which feeds a pair of Type 38 Hum-mer 3-foot by 10-foot single-deck screens with 20-mesh Ty-Rod screen cloth. The minus 20-mesh material is a milled product. The plus 20-mesh material



The 35-foot rotary drier with feed spout and dust-collectors above and furnace in background.

goes to a 7-ton surge bin from which a Hardinge constant-weight feeder supplies the 8-foot by 36-inch Hardinge conical mill. A 14-inch by 32-foot belt-conveyor carries the product of this mill to a chute feeding back into the 60-foot elevator ahead of the last pair of screens.

The Hardinge mill has Belgian Silex lining in the body and discharge cones, and Jasper Adamant Silica is used in the feed cone. Instead of the usual flint pebbles, 4-inch nepheline-syenite blocks are used as grinding media. These are hand-picked from the crude rock fed to the jaw crusher. This practice keeps contamination of the product

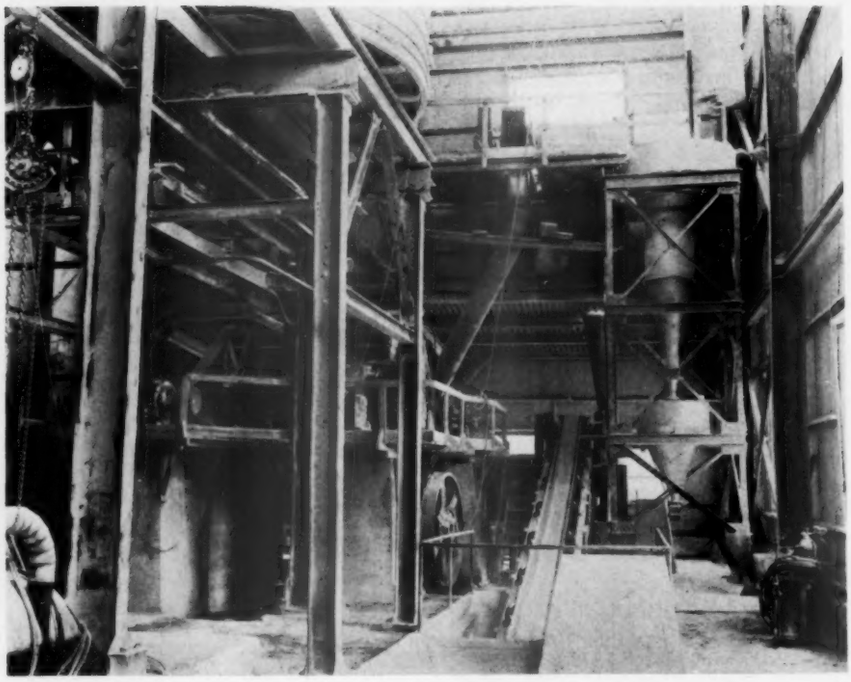


The belt-conveyor with magnetic head pulley which feeds rock to jaw crusher.

at the minimum with a consumption of 35 pounds of grinding blocks per ton of product.

The minus 20-mesh milled product from the two sets of Hum-mer screens is carried on a 14-inch by 75-foot belt-conveyor which discharges it over a Dings 12-inch by 30-inch low-intensity magnetic drum under the tail pulley. This removes most of the magnetite which has been released by the milling process and material goes to a pair of Exolon No. 105 four-deck grader screens which remove any plus 20-mesh material for return to the Hardinge mill. The true minus 20-mesh material is divided by these screens into 20- to 40-mesh and minus 40-mesh sizes to facilitate final magnetic separation. These two products are discharged from the grader screens to individual 40-foot elevators which discharge into two 40-ton storage tanks.

The magnetic separating equipment consists of four Dings Type IR high-intensity separators with 30-inch rotors and an Exolon Type D1 double separator with three 30-inch rolls. The minus 40-mesh material is fed from one bin to two of the Dings separators and one side of the Exolon separator.



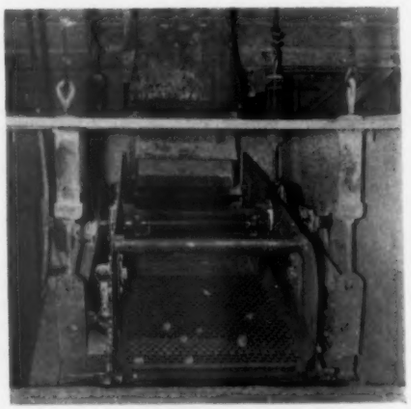
A general view in the mill showing the roll-crusher at left. At right is the belt-conveyor feeding rock to drier and cyclone collectors.

The 20- to 40-mesh material is fed from the other bin to the other two Dings separators from which the waste goes, via a 14-inch by 30-foot belt-conveyor and a 34-foot bucket-elevator, to a 5-ton bin feeding the other half of the Exolon separator. The final waste products from the first-mentioned Dings separators and the Exolon separator are discharged to wheelbarrows and dumped on an outdoor waste-pile.

About 10 tons of waste is produced in an 8-hour shift. This waste is stockpiled for future reprocessing, and a sprinkler system is used to keep the dust from being blown around. Some of this material has been sold to brick manufacturers, and this and other markets are being developed. A method for recovering some of this waste is also being worked on.

One of the two 4-deck grader screens which return plus 20-mesh material to the mill.

The two separator products are discharged on individual 14-inch by 30-foot belt-conveyors which discharge on a single 14-inch by 75-foot conveyor. A



The 2- by 6-foot inclosed vibrating screen which returns oversize rock to jaw crusher.

39-foot bucket-elevator discharges this minus 20-mesh product into a 200-ton storage bin.

The system described above is the normal operation for the production of minus 20-mesh nepheline syenite used by some of the major glass companies. The iron content of the crude rock as received is about 1 per cent. The magnetic separators remove the iron-bearing minerals and the iron content of the finished product is reduced to approximately .06 per cent. The finished material is discharged from the bins through Link-Belt rotary valves on a

(Continued on page 74)

Demand Forces Gravel Operator to Open Crushed-Stone Plant

A view of the quarry when it was first opened in the summer of 1938.

The plant with hillside stock-piles and truck-loading bins below. Crane in this picture is the same shown in the quarry below.

Old crusher shaft used to break down stone from bank and reduce large pieces to crusher size.

A RECENT addition to the ranks of crushed-stone producers in Rochester, New York, is the new plant of the John E. Redman Sand & Gravel Corporotion. This company started out 15 years ago with a small sand-and-gravel plant in Penfield, a small suburb 6 miles east of Rochester. In 1931 this was replaced by a larger plant which has been enlarged to a present capacity of 150 tons per hour. In recent years growing demand necessitated a further increase in productive capacity. Because of a local demand for crushed stone it was decided to increase capacity by building a crushed-stone plant. This plant, with a capacity of 150 tons per hour, went into operation in July, 1938, at a quarry about a mile from the company's sand-and-gravel plant.

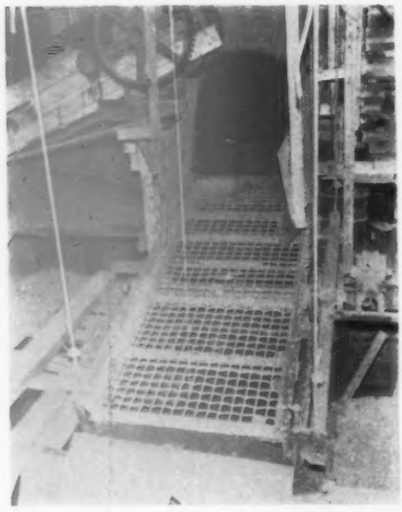
This plant is supplied from a deposit of dolomitic limestone with an unusually heavy covering of overburden. Nearly 50 feet of dirt covered the stone where the quarry was opened but this gets thinner as the quarry is developed. It is being removed with a shovel and trucks assisted at times by a Marion Type 32 crane with a 60-foot boom which has a 1½-cubic yard drag-line bucket. This same machine serving as

The wagon drill being used to open a new face. Tractor in background.

The final screening building perched on the hillside with stock-piles below.

a crane is used for rehandling from stock-piles.

The rock is in a somewhat broken formation in layers from 6 inches to 2 feet thick but drills easily. An 18-foot cut was first made to develop adequate working area. A second 18-foot cut was then made and a third is now in progress. The quarry will then be enlarged at this level. Drilling is being done with an Ingersoll-Rand wagon



The single-deck scalping screen with conveyor from primary crusher at left.

drill using detachable bits in sizes of from 2½ to 1¾ inches, depending on the depth of the hole. National Powder Co. 40 and 50 per cent. gelatin are used and as many as 42 holes are shot at one time from a power line. Very little secondary drilling is done, large rocks being broken with a "skull cracker" consisting of an old crusher shaft, which is handled by a crane. This is also used for breaking down rock from the face. An Allis-Chalmers tractor with a bulldozer is used to clean up the quarry.

Stone is loaded by a Bucyrus-Erie 50-B steam shovel with a 2-cubic yard dipper into 5-ton Mack Bulldog trucks. Usually three trucks are used to haul the stone to the Allis-Chalmers 5K gyratory primary crushers which is at the quarry level. The minus 6 inch product of this crusher is carried on a 28-inch by 230-foot inclined belt-conveyor to the first plant building, where it is discharged on a 4-ft. by 10-ft. Seco Special 1-deck screen equipped with National 2½-inch wire cloth. The rock passing over the screen can be chuted to any one or more of four secondary gyratory crushers each set for different-sized products ranging from New York No. 3A down to No. 1 (2-inch to ¾-inch).

The products of these crushers and the material passing through this screen are carried on a 24-inch by 65-foot belt-conveyor running to the screening building which is perched on the brink of a steep hill. A 4-foot by 12-foot Seco double-deck screen does the coarse sizing. Ordinarily this screen is equipped with 1⅞-inch and 1-inch cloth on its top and bottom decks, respectively. Oversize stone is returned to the secondary crushers on a belt-conveyor. Material retained on the bottom deck goes to storage as 3A stone. Material passing through the bottom deck goes to a similar screen equipped with ⅝-inch and ¼-inch cloth. The three products of this screen, No. 2, 1 and 0, also go direct to storage. Storage in this case means stock-piles at the bottom of the 105-ft. hill on which the screening plant rests. Chutes extending part way down the hill guide these products to their individual piles which are separated with wooden partitions.

All shipments are made by truck. Two cranes, an Erie and an Osgood, each with ¾-cubic yard clam-shell buckets remove stone from the stock-piles into three steel truck-loading bins, two with two compartments and a third having only one compartment. On the top of one of these bins is a Niagara vibrating screen which is used for washing certain types of stone. All shipments are weighed on a Fairbanks dial truck scale.

Nepheline

(from page 72)

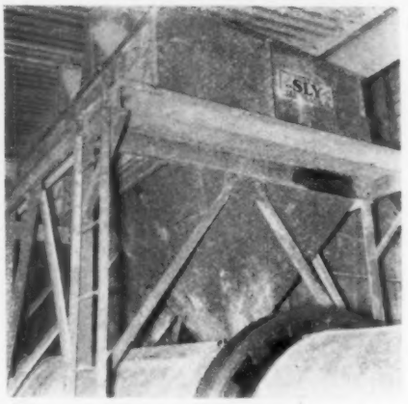
14-inch by 38-foot belt-conveyor. A 54-foot bucket-elevator discharges them through a wooden chute into box-cars for shipment.

The entire mill department is connected to a Sly Model 113 dust-collector, which handles 41,000 cubic feet of air per minute. Dust is discharged from this collector to three 9-inch diameter screw-conveyors. A 54-foot bucket-

The dust-collector which is connected to all equipment outside the mill building.

elevator discharges it into two 75-ton storage tanks. Link-Belt rotary valves under these bins feed the dust to a 14-inch by 23-foot belt-conveyor from which a 54-foot elevator discharges it through a wooden spout into cars. This material is used in products where a slightly higher iron content is no objection.

Because of the growing demand for very finely ground nepheline syenite in the pottery and enamel trades, additional equipment has recently been installed for the production of minus 200-



The two dust-collectors which reclaim dust from the rotary drier.

mesh material. Minus 20-mesh non-magnetic material is fed from the 200-ton storage bin through a Hardinge volumetric drum feeder to a 5-inch by 37-foot Redler conveyor. This material is split to a pair of Type 38 Hummer 3-foot by 5-foot screens operating under vacuum. The material retained on the 200-mesh cloth is discharged into a 48-inch by 8-foot Hardinge mill, whose product is discharged on a 14-inch by 28-foot belt-conveyor that feeds it back to the Redler conveyor preceding the screens.

The minus 200-mesh material passing through the screens is drawn by an American No. 30 Type E fan into an 8-foot diameter Hardinge cyclone followed by two Sly Type 34 dust-collectors. This fan also draws dust from the mill and creates the suction at the screens. The products of the cyclone and collectors are discharged into two 125-ton bins from which they are loaded into cars by a 7-inch by 65-foot Redler conveyor. This minus 200-mesh material is used chiefly for pottery, enamel, porcelain, tile.

Opens Gravel Pit

The Allen T. Boyd Company has recently opened a sand-and-gravel pit on Highway 60 just east of Waterville, Minnesota, where washed sand is being turned out. Howard Boyd is in charge of the plant.

1939 in Review

CRUSHED STONE

CONDITIONS in the crushed-stone industry improved considerably in 1939 and as a result many producers have made or are making improvements to their plants. Two outstanding plants of large capacity were built as well as a number of small and medium-size plants. The bulk of expenditures, however, went into plant improvements. The production of stone sand, which had been increasing steadily, took a sharp upward swing in 1939 due in part to its inclusion in specifications from which it had formerly been excluded.

From present indications the volume of crushed-stone production in 1939 will exceed the 123,072,820-ton volume of 1938 by at least 10 per cent. As 1938 volume was only 6 per cent. under that of 1937, last year may set a new "high" since 1929. As prices in general were firm during 1939, the value of production may also be the highest in recent years. This year should see further improvement judging from construction volume and general business conditions.

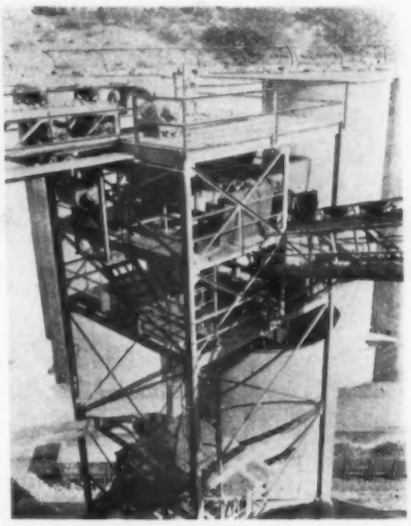
The Kelly Run Stone Company, Wilkes-Barre, Pennsylvania, built a new, modern crushed-stone plant with a capacity of about 125 tons per hour. Caterpillar tractors and Le Tourneau scrapers are used to remove the overburden from the sandstone deposit. Steam shovels load trucks which discharge the stone into a hopper, from which an apron feeder serves a 36-inch by 42-inch Farrel-Bacon jaw crusher. A belt-conveyor feeds the stone to a 6-foot by 25-foot Telsmith revolving scalping screen which removes all the minus ½-inch stone and dirt. The ½-inch to 1½-inch stone is elevated to the final sizing screens. The 1½-inch to 4-inch stone goes to a bin and can be loaded out as ballast or fed to either of two finishing crushers. Plus 4-inch rock goes to a Telsmith 13 B gyratory crusher, the product of which is returned to the main conveyor. A No. 36 Telsmith Gyrasphere and a Traylor gyratory crusher are used for finishing and their products are delivered by a belt-conveyor to the bucket-elevator described above. Two Telsmith and 2 Niagara screens are used for the final sizing. Seven sizes, including dust, are produced. Coarse rock can be returned to one of the crushers for further reduction.

A belt-conveyor under the bins can feed from any of them to the stone-washing plant, which has a scrubber, a resizing screen and a stone-sand classifier.

The new plant of the Kelly Run Stone Company, Wilkes-Barre, Pennsylvania, with the primary and two secondary crushers.

A new plant was built by the Arlington Stone Company at Leesburg, Virginia. The Telsmith equipment in this plant includes a 13 B primary breaker, a 36-inch Gyrasphere, a No. 7 belt-elevator and two 4-foot by 10-foot double-deck Pulsator screens.

The Sharp & Fellows Construction Company is using Diamond Iron Works equipment to produce ballast for the Santa Fe Railroad at Los Cerrillos,

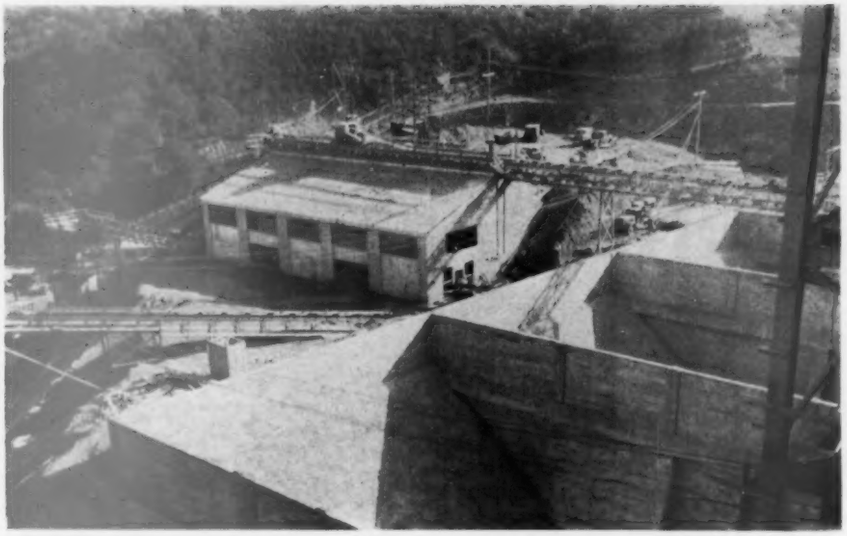


Screen which removes small rock from sugar-rock at plant of Permanente Corporation.

New Mexico. The equipment consists of a No. 65 Rotor-Lift portable crushing-and-screening plant with a 10-inch by 36-inch jaw crusher, a 30-inch by 20-inch double-roll crusher, and a 4-foot by 8-foot 2½-deck vibrating screen, all mounted on dual pneumatic-tired wheels. A portable belt-conveyor feeds the raw product to the inclined main conveyor which feeds the screen. The oversize is returned to the jaw and roll crushers and the Rotor-Lift elevator returns the crusher product to the main conveyor.

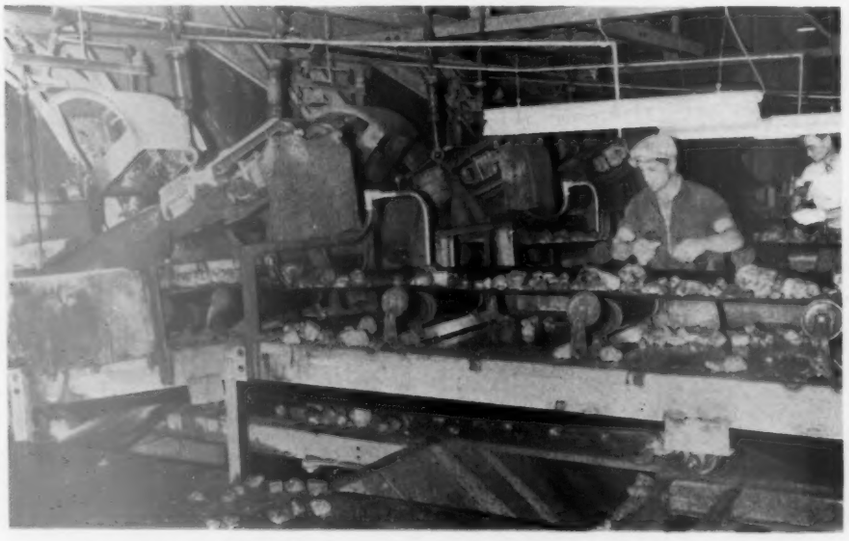
This plant produces 125 cubic yards per hour of 2-inch rock ballast and the

The plant of the Arlington Stone Company, Leesburg, Virginia, before it was inclosed.



The sugar-rock plant of the Permanente Corporation near Los Altos, California. Conveyor from raw stock-pile is at right.

Sugar rock being loaded from bin at Permanente Corporation plant into cars for shipment. The cement plant is in background.



Picking sugar rock on three belt-conveyors in the Permanente Corporation plant. Vibrating feeders are at left and vibrating tables are in background.

minus ½-inch stone is used for other purposes. The ballast is discharged on a 64-foot belt-conveyor leading to a bin. Another 70-foot conveyor carries the fine product to storage. This conveyor is driven by a Le Roi gasoline engine. All the other equipment is driven by a D-1700 Caterpillar Diesel engine.

The first part of the new cement plant of the Permanente Corporation to go into operation was the department devoted to the manufacture of rock for beet-sugar refineries. This was in operation in time for the sugar rock season which lasts from October through December. Most of the quarrying will be done during these months as the cement-rock storage has adequate capacity to supply the plant for the remainder of the year. The sugar-rock department has a capacity of over 50 tons per hour.

The 2½-inch to 5-inch rock from the scalping screen is carried on a belt-conveyor and through a chute to a storage pile with a capacity of 40,000 tons. The chute will be replaced with a second 350-foot conveyor which will considerably increase the storage capacity. This conveyor will have a drop of 50 feet and its synchronous motor will regenerate power under load. Rock is reclaimed through a tunnel by a Jeffrey-Traylor vibrating feeder on a belt-conveyor. This feeds to another belt-conveyor which carries the stone over the cement-mill area to the picking plant. A Bodinson automatic traveling tripper discharges the stone into the multiple compartments of a bin. Stone is withdrawn from these compartments by 3 Jeffrey-Traylor vibrating picking tables and by 3 Jeffrey-Traylor vibrating feeders following by flat belt-conveyors. Sprays wash the stone as it is drawn from the bin. Chert is hand-picked from these tables and conveyors and is carried on a series of two conveyors to a waste pile.

The good rock discharged from the tables and conveyors is carried on a belt-conveyor to a Tyler Ty-Rock 5-foot by 8-foot double-deck screen, which is equipped with sprays. This screen removes minus 2½-inch rock created by breakage for the lime plant. The 2½-inch to 5-inch stone drops into a steel bin from which it is loaded into cars for shipment. A General Electric 300-hp. Diesel-electric locomotive is used for switching.

The Arundel Corporation, Baltimore, Maryland, remodeled and reëquipped a number of the crushed-stone plants which it acquired in the past few years. A number of Telsmith crushers and screens and other equipment were furnished for these plants. Telsmith equipment in one plant near Baltimore includes a 10 B primary breaker, a 36-

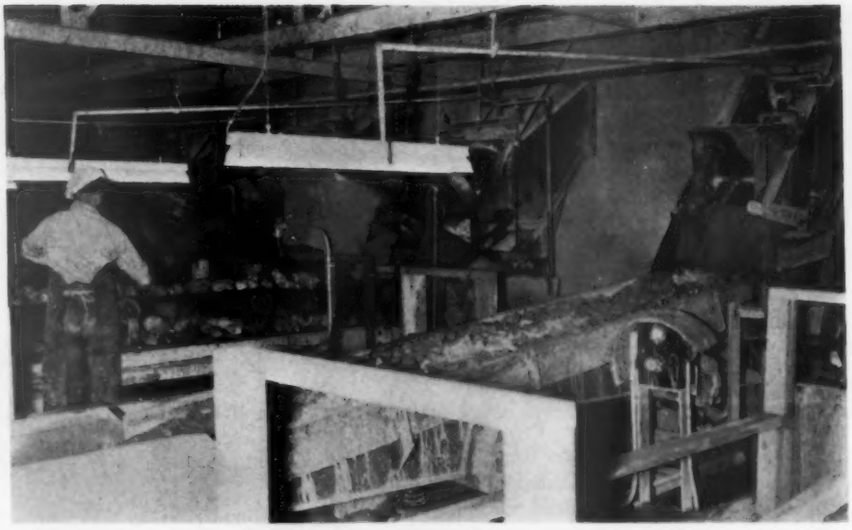
inch Gyrasphere crusher and three Pulsator vibrating screens.

The Kentucky Stone Company, Louisville, Kentucky, also revamped and reëquipped a number of plants. A No. 36 Telsmith Gyrasphere and a vibrating screen were installed in the Irvington, Kentucky, plant. Telsmith screens and Gyraspheres were installed in other of the company's plants also.

The Lamar Stone Company, Princeville, Illinois, recently built a new plant. Telsmith equipment was used throughout, including a 36-inch Gyrasphere, a 13 B breaker, a 55-foot belt elevator and a 4-foot by 10-foot triple-deck Pulsator screen.

The Paul Frank Quarries, North Vernon, Indiana, are engaged this winter in completely rebuilding their crushed-stone plant. A new Pioneer 24-inch by 36-inch jaw-crusher will do the primary crushing while a Pioneer 54-inch by 24-inch roll-crusher will handle secondary reduction. Three triple-deck vibrating screens will accomplish the separation in the screening building under construction. The first gradation will be made on a new Pioneer 4-foot by 10-foot unit, washing and final separation taking place on two 4-foot by 8-foot vibrators. The output, used almost exclusively for state-highway construction and maintenance, is expected to exceed 100 tons per hour.

One of the vibrating screens in the new plant of the J & K Stone Company.



Sugar-rock picking tables in the plant of the Permanente Corporation. Conveyors and vibrating feeders are in background.

A portable crushing-and-screening plant operated by the Sharp & Fellows Construction Company producing crushed-stone ballast near Los Cerillos, New Mexico.

One of the outstanding commercial crushed-stone plants of the year was built by the Camp Concrete Rock Company near Brooksville, Florida. Stone for this 200-ton per hour plant is loaded into cars on inclines. The new equipment includes 5 Allis-Chalmers vibrating screens, a revolving scrubber, Goodyear conveyor belting and Stephens-Adamson conveyor idlers. In addition 4 log-washers, a revolving screen and roll-crushers were brought from another plant. Cars on trestles discharge the various products to stock-piles over a 460-foot tunnel for loading out on a conveyor.

An even larger plant was built by the Rion Crush Stone Corporation at Rion, South Carolina, in the heart of a dimension-granite producing section. Waste from dimension quarries is used along with the regular quarried material. All the buildings are constructed of masonry, concrete and steel. A radial tower system of storage is used.

The J & K Stone Company built a new 100-ton per hour plant at Rigdon, Indiana. Quarrying is done in the usual manner and stone is hauled to the

The new plant of the J & K Stone Company at Rigdon, Indiana. The primary-crusher building is at right.

plant by trucks. The product of the Allis-Chalmers No. 8 primary gyratory crusher is conveyed to a revolving screen which discharges finished rock sizes into four 50-cubic yard steel bins. Any desired size can be discharged from this screen to an Allis-Chalmers 6-inch reduction crusher from which it is conveyed back to the main conveyor. Under the revolving screen is a Deister Plato 3-deck screen which is used for additional sizing. Any material or combination from either screen can be fed on a conveyor to a 3-deck Deister Plato screen for washing and these products go to 3 bins with a combined capacity of 75 cubic yards.

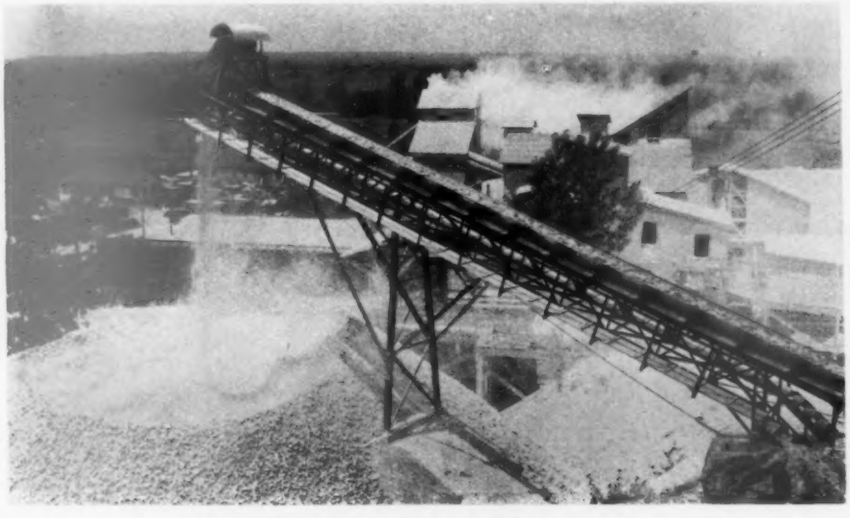
The Pittsburgh Limestone Corporation, a subsidiary of the United States Steel Corporation, contributed one of the most interesting recent developments with a new installation for the production of stone sand at its Annandale, Pennsylvania, mine. In an addition to its crushed-stone plant bowl and rake classifiers, vibrating screens, electric vibrating feeders, sand pumps, etc. were installed. A complete description of this plant and process will be found elsewhere in this issue.

A new plant for the production of road stone and agstone was built by the Independent Gravel Company at Rogers, Arkansas.

One of the many companies which improved their quarry haulage methods during the year was the New York Trap Rock Corporation which operates four large crushed-stone plants on the Hudson River in New York. Late in 1938 this company had purchased a few trucks and 2-wheeled trailers for one of its four active quarries. These proved to be so satisfactory that various types of haulage equipment at all these quarries have been replaced with this kind of equipment. A total of 29 of these trailers, all Easton-Phoenix Model TR-10, side-dump type, are now in use. While rated at 10-cubic yard capacity they are actually hauling much larger pay-loads. Each trailer is equipped with outrigger feet on one side, dual rear wheels with Goodyear pneumatic tires and Timken axles and bearings. Most of these trailers are hauled by Chevrolet tractor-type trucks, some of which are equipped with Truckstell-Eaton 2-speed axles or Truckstell Thornton dual rear driving axles. All are fitted with Goodyear tires. This equipment has cut haulage costs as much as 75 per cent. with an over-all saving of about 50 per cent.

Trucks with semi-trailers being hauled up a 10-per cent. grade in the quarry of the New York Trap Rock Corporation at Verplanck, New York.

One of five truck and semi-trailer combinations operated by the New York Trap Rock Corporation at Tomkins Cove, New York.



The new stock-piling system for primary crusher product at the Valmeyer, Illinois, plant of the Columbia Quarry Company.

At the Haverstraw, New York, plant, 7 trucks and trailers replaced 12 old 5-cubic yard trucks and are hauling considerably more rock. The truck-trailer units average 4 miles per gallon of gasoline compared to 1 mile for the old trucks which carried only half the pay-load. Two old 7-inch well drills at this quarry were replaced by 2 Bucyrus-Erie 9-inch electric well drills which have reduced drilling costs considerably. A new Ingersoll-Rand wagon drill was also recently installed.

The next installation was at the Tomkins Cove plant, where five Easton trucks and trailers replaced 3 steam locomotives and eight 8-cubic yard cars with from 1 to 3 skips mounted on each

car. The capacity of this operation was also increased by the change.

At the Verplanck quarry 5 Easton trucks and trailers replaced a remote-controlled electric haulage system which was abandoned only because the quarry had become too deep for this system to be used to advantage. A special incline 600 feet long with a slope of 10 degrees is used for the trucks. These operate under their own power elsewhere, but are hauled up the incline by two small cable-drawn barney cars which automatically engage and disengage themselves. Each of these cars is operated by a 100-horsepower electric hoist.

The Clinton Point plant, the newest and largest of all, has an average capacity of over 4,500 cubic yards daily. Ten Easton truck-trailers replaced eighteen 5-cubic yard dump trucks and are handling more material. Two new Bucyrus-Erie 120-B steam shovels replaced five old smaller steam shovels in this quarry. Two new Bucyrus-Erie 9-inch electric well drills and an Ingersoll-Rand wagon drill were also installed. Two new well drills were installed at the Verplanck plant and one at Tomkins Cove.

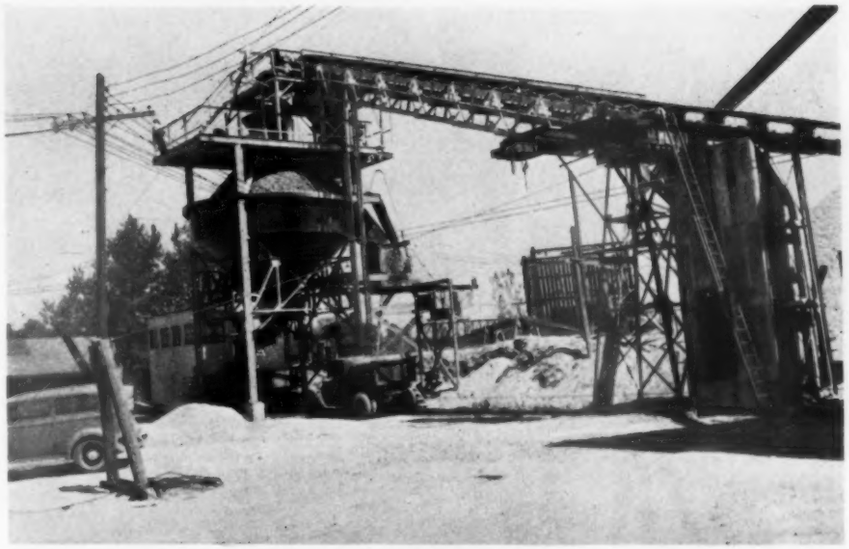
An interesting installation was made

Loading a truck under the new loading bin of the Weston & Brooker Company.

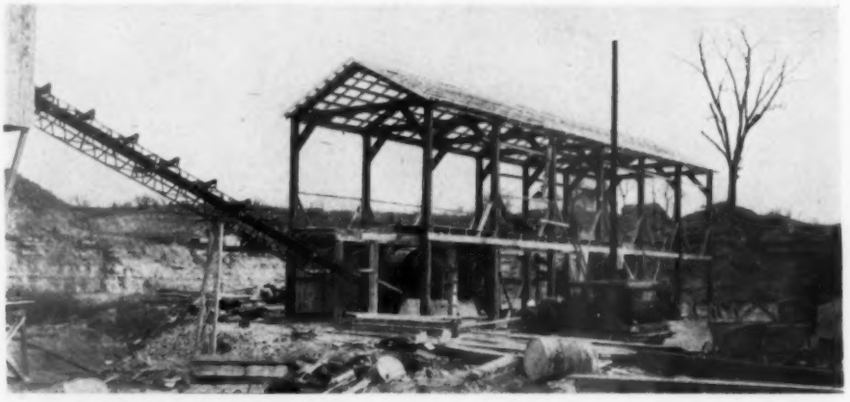
by the Weston & Brooker Company at its Cayce, South Carolina, plant to increase the car- and truck-loading capacity. Cars were formerly loaded by means of a reclaiming conveyor under five large steel bins and trucks were loaded from a small wooden bin. In March, 1939 this conveyor was extended to its present length of 180 feet. Aggregates are discharged either singly or in any desired blend on this conveyor, which carries them to a head box which has a gate for either car or truck loading. Stone for the trucks is passed over a 1-deck vibrating screen with sprays into a revolving spout feeding any of 4 compartments of a 150 ton steel bin.

Sliding gates control the discharge of stone from these compartments into a 5-foot diameter by 2-foot high cylindrical steel box from which trucks are loaded. The use of this box makes it possible to leave the gates set for any desired blend, the box serving as surge storage between trucks. Trucks are loaded on the 45-foot platform of a Howe 50-ton truck scale. The weight empty is obtained before loading is begun and the length of the platform makes it possible to move the truck forward while loading and obtain the final weight before it leaves the scale.

When loading cars the stone is discharged from the head box over a series of two stationary screens. The stone drops through a chute into a stone ladder from which it is discharged with little breakage into the loading box. This box has an air-controlled gate and is moved from side to side while loading to prevent segregation. An Ingersoll-Rand air-hoist moves the box and an electric hoist moves a string of 10 cars in and out of the loading position. With this system one man can load a 60-ton car in 8 minutes; truck loading has also been speeded.



The new truck- and car-loading system of the Cayce, South Carolina, plant of the Weston & Brooker Company.



Crusher building of the new plant of the Paul Frank Quarries, North Vernon, Indiana, nearing completion.

Recently a Marion electric shovel was purchased to replace one of the old steam shovels in the quarry.

The Raleigh Granite Company of Raleigh, North Carolina, several years ago put 2 Easton 8-cubic yard truck-trailer units in its Rolesville quarry. (*P&Q*, August, 1937, page 39.) These were so satisfactory that several additional orders have since been placed. In 1938

The screening building and bins of the new Paul Frank Quarries plant.

One of the plants of the Arundel Corporation, Baltimore, which was completely rebuilt and re-equipped.

The new plant of the Lamar Stone Company, Princeville, Illinois, viewed from the quarry.

Some of the ten Diesel-powered trucks purchased by the Pennington Trap Rock Company to haul rip rap.

three 10-cubic yard units were put in operation at the Woodleaf quarry to replace old 5-cubic yard dump trucks. These saved their purchase price in only 9 months of operation. Early in 1939 the 8-cubic yard trailers were moved from Rolesville to the company's Wendell quarry, the 10-cubic yard trailers were moved from Woodleaf to Rolesville and three new 12-cubic yard Easton trailers were installed at Woodleaf. Each of the three quarries now has the fleet best suited to its needs.

The Columbia Quarry Company has always been one of the most progressive producers in this industry and during 1939 a number of improvements were made at its plants. At Valmeyer, Illinois, trucks had replaced cars in hauling stone from the mine but further improvements were found to be necessary to provide a satisfactory feed of stone to the plant. In March, 1939, a raw-material surge stock-pile was installed which has solved the problem. Stone is dumped from trucks by means of Curtis air-hoists into the Allis-Chalmers No. 12 N gyratory crusher which had been placed at the mine level. A 30-inch by 80-foot inclined belt-conveyor discharges the stone on a 4,000-ton stock-pile. About 1,200 tons of stone is reclaimable through a single gate in a concrete tunnel under the pile. A pan-feeder discharges the stone on a 24-inch by 8-foot horizontal belt-conveyor running to the plant. Secondary reduction is done by an American 30-inch

The latest of twelve shovels of the same make purchased by the Massachusetts Broken Stone Company.

by 40-inch hammer-mill installed recently and an older ring-mill.

The Massachusetts Broken Stone Company purchased a Thew Lorain 70 shovel for its plant at Waltham, Massachusetts. This is the twelfth Lorain shovel this company has purchased in the past 11 years.

The Newton County Crushed Stone Company, Kentland, Indiana, installed a 3-foot Symons short-head standard cone crusher which is used to produce agstone.

One of the most interesting installations was that made by the Pennington Trap Rock Company at Pennington, New Jersey. Ten Sterling chain-drive tractor trucks with Cummins 150-hp.

(*Continued on page 91*)

The new stone-sand addition to the plant of the Pittsburgh Limestone Company.

1939 in Review

PORTLAND CEMENT

THE production of cement in 1939 continued the upward swing which began late in 1938 and both production and shipments were ahead of those of any year since 1931. Beginning with June, 1937, the shipments each month have exceeded those for the same month in the preceding year. Without actual data for December, it is estimated that 1939 production was about 122,000,000 barrels and shipments about 124,500,000 barrels with a value of approximately $180,000,000. This is an increase of about 15 per cent. in production and 17 per cent. in value over 1938. Prices in general were firm and in some sections improved over the previous year.

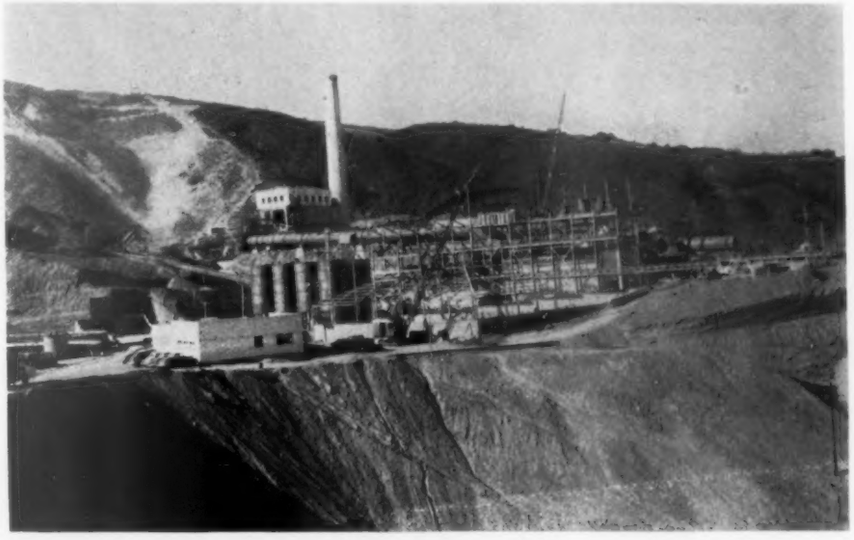
Prospects for 1940 are on the whole encouraging. The war in Europe brought a quick end to foreign competition along the eastern seaboard and opened export markets in South America toward the close of the year. Elimination of foreign competition is important not so much for its volume as for its depressing condition on prices, which extends in some degree for a considerable distance inland. General business conditions and construction volume presage an even better year in 1940 and the increase in private construction volume is distinctly encouraging. The present governmental investigation of the building industries may result in lower prices in some sections. If the present basing-point price system is abolished, this might result in further price reductions and operators of high-cost, inefficient plants might be forced to improve their operations.

From an operating standpoint the important developments of the year were the construction of a new plant in California and the almost complete reconstruction of two Eastern plants. In contrast to the trend toward wet-process plants, one of the latter was converted from the wet to the dry process. The new plant built is the first in this country to be designed and erected to use flotation in the processing of raw materials and is the second to use this system which, although developed in this country, first gained acceptance in a foreign country. A third plant is now installing this system.

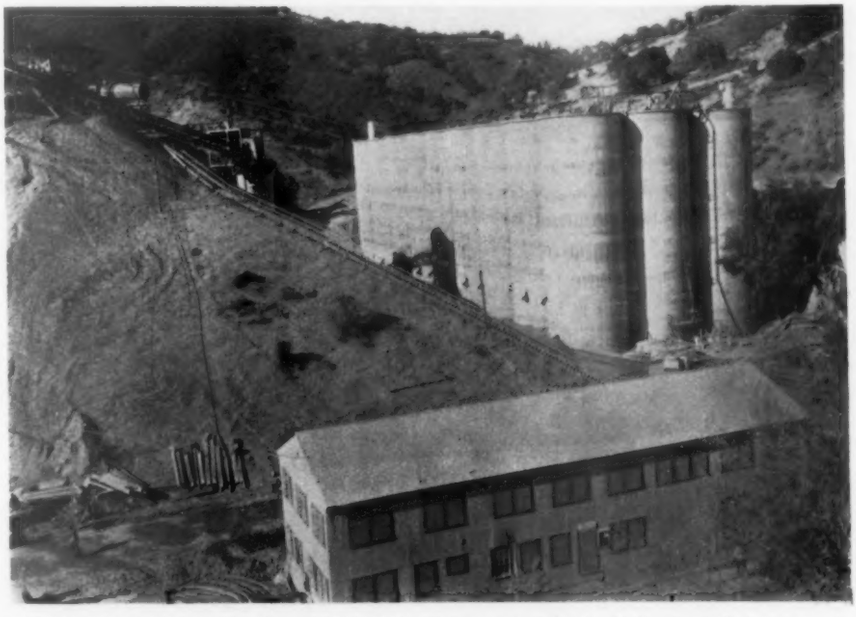
The industry again devoted most of its attention and expenditures to the reduction of operating costs. Many plants installed direct-firing coal mills, coolers, recuperators and other equipment in their efforts to lower fuel consumption and produce a higher grade clinker. Dust-collectors including a number of large-capacity electrical precipitators, were installed in many plants.

The new 7,000-barrel plant of the Permanente Corporation at Los Altos, California, which is now nearing completion, is, of course, the outstanding development of the year. This plant, which will supply 5,800,000 barrels of low-heat cement for Shasta Dam, an important link in California's Central Valley Project, is scheduled to start shipments March 1, 1940. Much of the interest in this plant has been due to the originality of its design and to the advanced types of equipment used in it. The deposit has intrusions of chert and is high in silica and it was not until the flotation methods of the Separation Process Company were developed that it was possible to take advantage of the nearness of this location to the San Francisco Bay area. In addition to cement, sugar-rock and quick lime are produced.

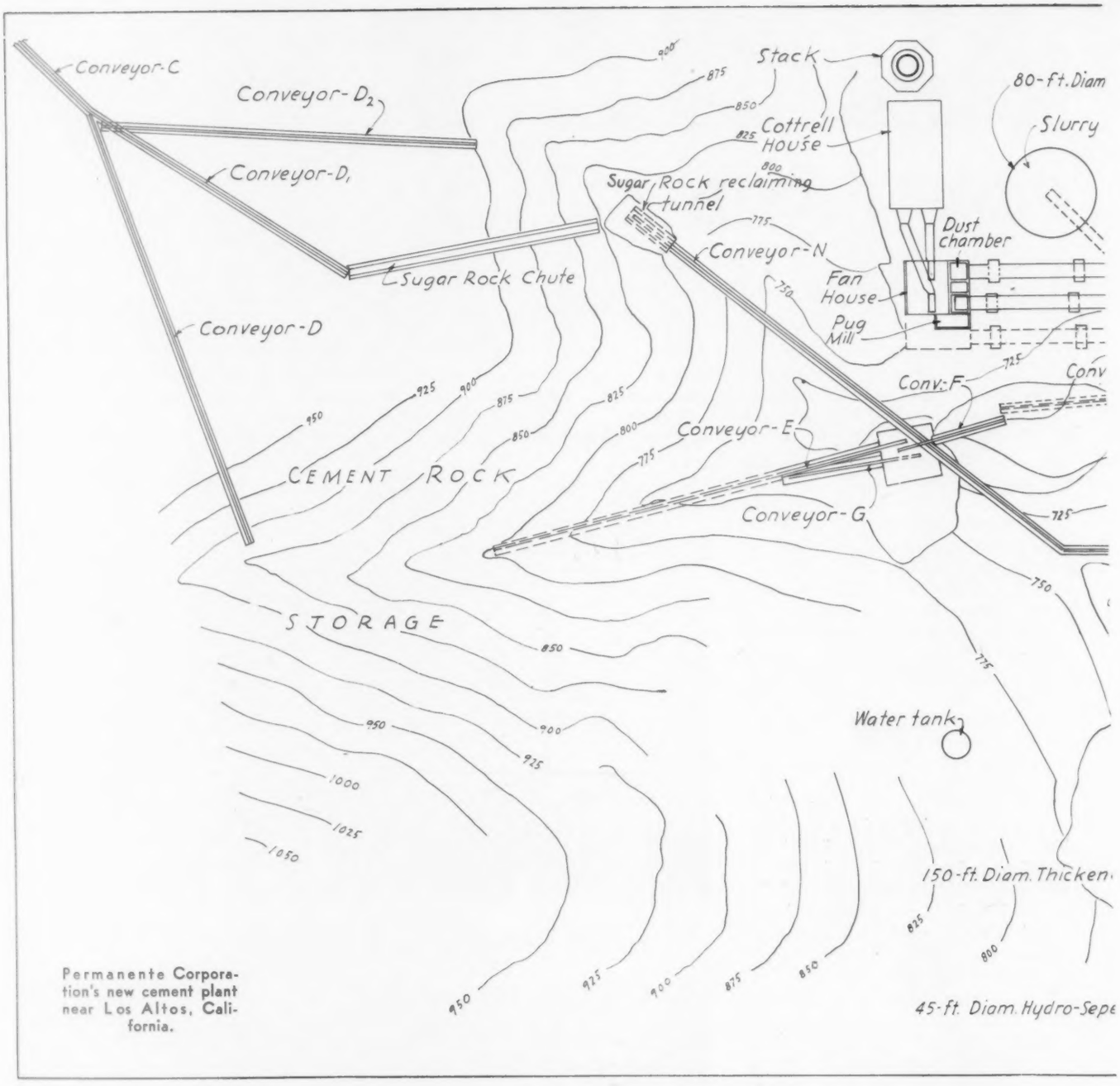
The distinctive features of this opera-



The Permanente Corporation cement plant under construction. Laboratory building in foreground, precipitator and stack in background. (All Permanente pictures used in this article were taken November 10, 1939.)



The 500,000-barrel cement storage silos at the Permanente plant. In foreground is temporary office building. At left is sugar-rock loading station.

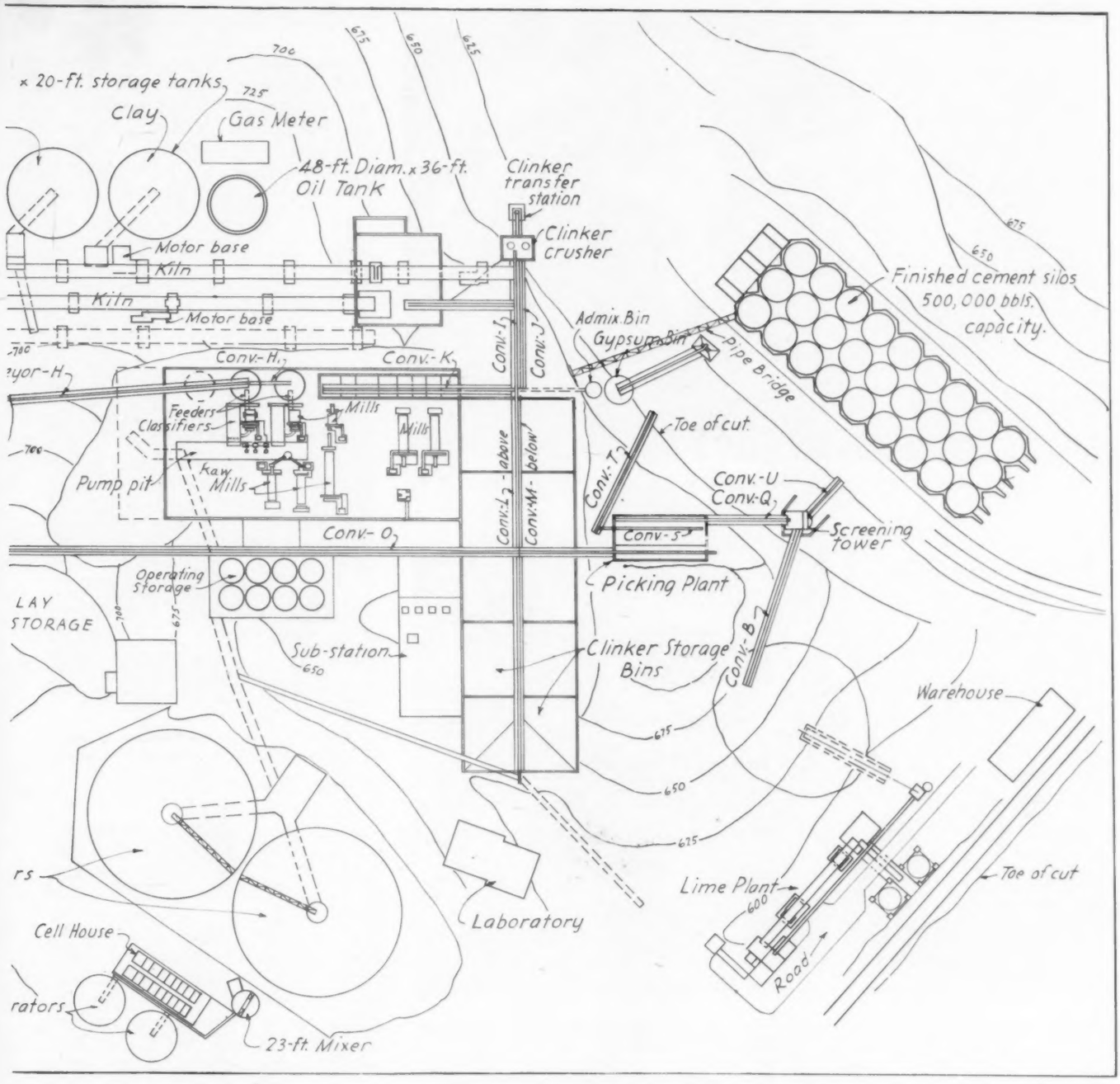


Permanente Corporation's new cement plant near Los Altos, California.

tion begin in the quarry. The deposit is highly fractured and breaks down easily with few rocks large enough to require secondary shooting. A Bucyrus 8-inch well drill is used and springing shots are made before the final blast. At present the Bucyrus-Erie 120-B electric shovel is loading stone into 2 LeTourneau 30-cubic yard buggies, each mounted on 16 pneumatic-tired wheels. Caterpillar and Cleveland tractors haul these buggies to the edge of the quarry floor where the stone is discharged into a hopper. Stone is discharged over a 5½-inch rail grizzly into a 24-inch by 36-inch Farrel Bacon jaw crusher. Three flights of 36-inch conveyors carry the stone 5,155 feet with a total drop of 495 feet to a screen tower. Each conveyor has a 200-hp. motor which is regenerative under load.

A 5-foot by 12-foot Tyler Ty-Rock screen separates the 2½-inch to 5-inch sugar rock and the 5-inch plus and 2½-inch minus cement rock. The cement rock is carried on a boom conveyor to a storage pile in a ravine which has a capacity of 450,000 tons. A tunnel belt-conveyor, fed by Jeffrey-Traylor vibrating feeders, carries the stone to 2 Kennedy-Van Saun No. 49 gyratory crushers. The product of these machines goes to a Tyler screen, which returns the material over ½-inch in size to them. The minus ½-inch stone goes to an intermediate storage pile.

Another tunnel conveyor feeds this stone to two raw-mill feed bins. Merrick Feedoweights serve the 9-foot by 11½-foot Traylor tube-mills. The slurry from these mills is discharged into 2 Dorr 12-foot by 31½-foot Multi-Zone classifiers in closed circuit with the mills. The overflow from the classifiers is pumped by three 5-in. Wilfley pumps into 2 Dorr 45-foot diameter hydroseparators. The overflow from these contains about 5 per cent. solids and goes into 2 Dorr 150-foot diameter thickeners. Each of the thickener torque arms has 2 Hydroseal 4-inch pumps for recirculation. The underflow from the hydroseparators contains about 25 per cent. solids and goes by gravity into two 20-foot diameter turbo-mixers from which a Byron Jackson pump feeds to 6 Fagergren 66-inch sloping-side froth flotation cells set in two rows of 3 each. The product of these rougher



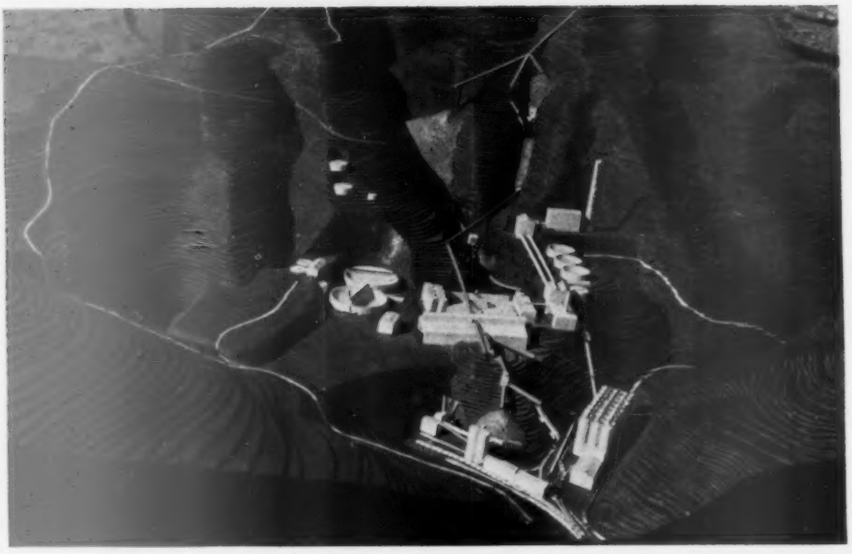
cells is finished concentrate; their tailings go to two sets of 3 scavenger cells each. The product of these goes to two sets of 2 cleaner cells each, which also produce finished concentrate. The tailings from the scavenger cells are wasted and those from the cleaner cells are returned to the turbo-mixers by Byron Jackson pumps. The finished concentrate, which is about 30 per cent. solids, flows by gravity into the thickeners.

The underflow from the thickeners contains about 70 per cent. solids and goes to two 5-inch Wilfley pumps. The flow is controlled by Masco-Grigsby rubber pinch valves and Fuller battery-operated automatic cut-off valves. This slurry is pumped into 8 steel blending tanks, some of which are also used for clay and iron ore-clay slips. Two 8-inch Wilfley pumps circulate for blending between these tanks and these lines also have pinch and automatic cut-off valves.

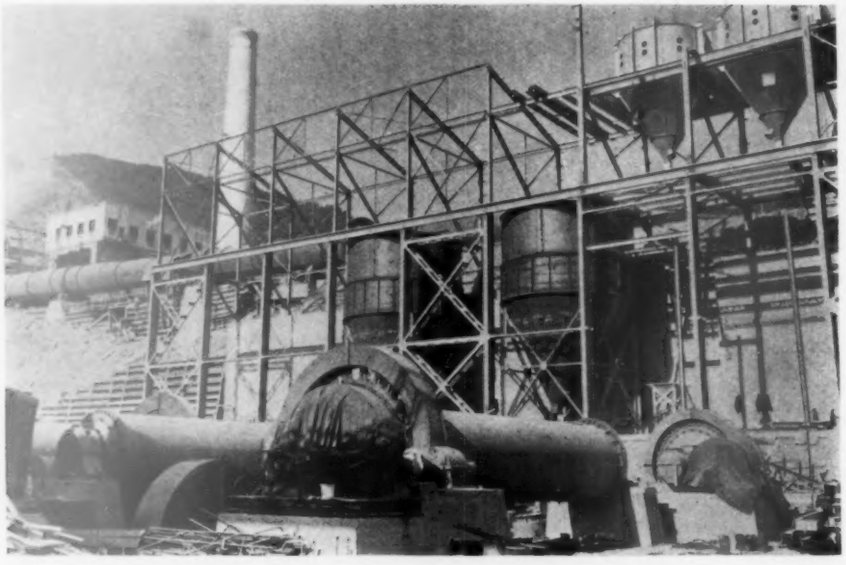
The present source of clay is a deposit near the flotation plant. A tractor with a bulldozer supplies it to the feeders of the Allis-Chalmers 9½-foot by 10-foot ball-mill. The clay slip is elevated to a pug-mill followed by a Tyler Hum-mer screen in closed circuit with the mill. A 3-inch Wilfley pump feeds the slip into an 80-foot diameter Dorr clay-storage tank from which it is pumped to one or more of the 8 blending tanks already described. When iron ore is required, this is scraped in with the clay and processed as above before going to one of the blending tanks.

Two 5-inch Wilfley pumps handle the blended slurry to the two 7-foot by 26-foot secondary raw mills, one Smidth and one Traylor. All the blending is done ahead of these mills. Two more 5-inch Wilfley pumps transfer the slurry into two 80-foot diameter Dorr slurry-storage tanks. Two other 5-inch Wilfley pumps supply the Ferris-wheel feeders of the two rotary kilns.

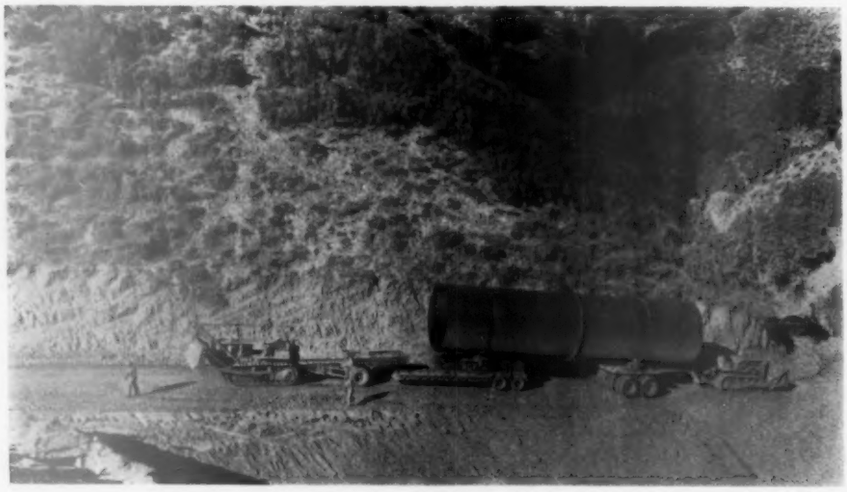
The Smidth kiln is 460 feet long and has 12-foot diameter end sections and an 11-foot diameter center section. Attached to this kiln is a single-row Unax cooler. The Traylor kiln is 450 feet long and 12 feet in diameter. It is followed by a 11½-foot by 120-foot rotary cooler and is equipped with a Traylor Cheesman burner. Natural gas is the fuel used and there is a standby fuel-oil system.



Model of the new Permanente Corporation plant and site which gives some idea of the rugged country in which it is being built.



One of the Permanente finish-grinding mills with two separators at right above. The raw mills and their feed bins are in background.



A section of the 450-foot kiln being moved by two tractors up a steep grade to the Permanente plant.

Both kilns are connected to a 4-unit, 5-section Western Precipitation Corporation Cottrell electrical precipitator which is expected to be about 99.6 per cent. efficient. Screw-conveyors will return the collected dust to the system. The precipitator is vented to the 18-foot interior diameter by 225-foot high Rust concrete stack. Space was left in design-

The electric shovel in the Permanente quarry loading rock into 30-cubic yard buggies.

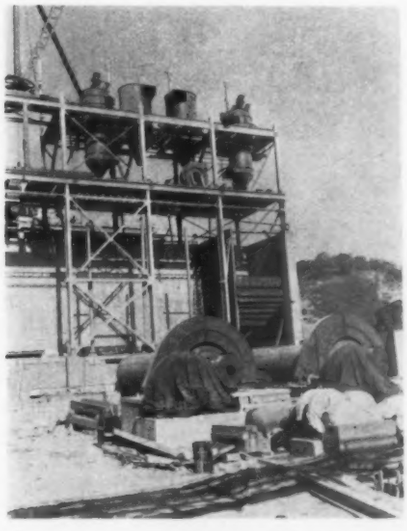
ing this plant for a third kiln and the additional mills required.

The clinker from the Unax cooler is discharged to a Smidth Skipulter, from which it is discharged, with the clinker from the Traylor cooler, into another Skipulter. Two Traylor gyratory crushers reduce the clinker to ⅜-inch size and under before a series of belt-conveyors carry it either to the finish-mill feed bins or to the clinker-storage bins. There are 5 U-shaped concrete bins, each 100 feet wide and 66 feet long, with a total capacity of 312,000 barrels. Separate compartments will be used for standard, modified, low-heat, high-early-strength and sulphate-resisting cements. The entire structure is dust proof with sealed steel openings. Clinker is withdrawn from these bins by Jeffrey-Traylor feeders to a tunnel belt-conveyor, which takes it to the mill-feed bins. Gypsum and admixtures are fed to separate bins. Merrick Feedoweights will proportion the desired ingredients to the two 8-foot by 36-foot Smidth Unidan mills, which are in closed circuit with Smidth cyclones and separators. Feedoweights also feed an 8-foot by 10-foot Traylor ball-mill followed by an 8-foot by 40-foot ball-mill. A Fuller-Kinyon pump feeds the product to a cyclone followed by two 16-foot Raymond separators, from which the rejects are returned to the second mill.

Fuller-Kinyon pumping systems feed the finished cement from each of these systems to the 27 cement-storage silos, which have a capacity of 500,000 barrels including their interstices. These silos are of reinforced concrete and were built by the Rust Engineering Company. Fuller cloth-bag dust-collectors on the tops of the silos release air from the system. The silos are arranged in 3 rows and a movable Fuller-Kinyon pump will reclaim from them for loading into cars. Side chutes on the 18 silos on the two outside rows will allow direct car-loading in bulk, and the pump can be used to transfer cement to these bins from those in the center row. A pack-house will be built later as all Shasta Dam shipments will be in bulk.

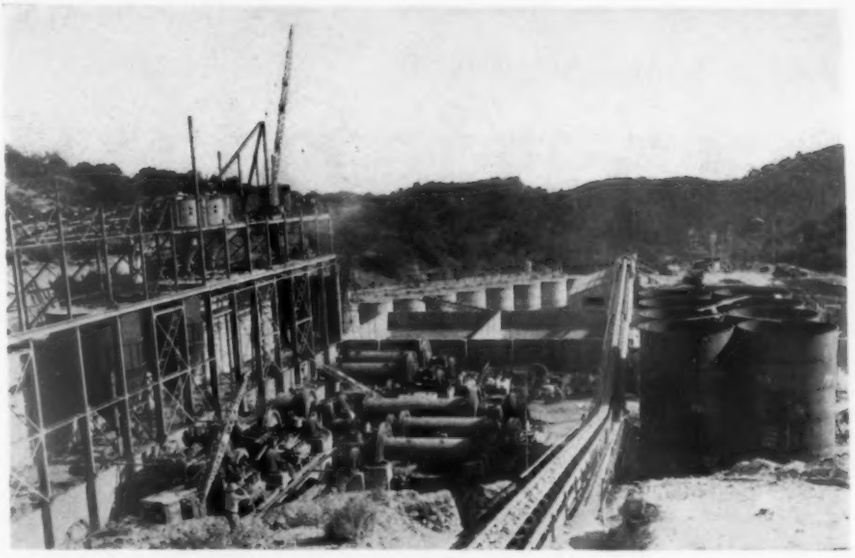
Typical of the attention given to details in this plant is the method for cleaning. Instead of the usual gang of clean-up workers, all the equipment and buildings are washed down with a hose. The water and cement dust go through drains to a sump from which they are pumped back into the system. All other used water goes to a settling pond for re-use. Each of the 6 Fuller-Kinyon pumps in the plant has an individual Fuller rotary compressor near it.

Along with other nonmetallic-mineral industries, the cement industry paid considerable attention to the improvement of methods of hauling stone from quarries to plants. One of the outstanding installations was recently made by the Marquette Cement Manufacturing

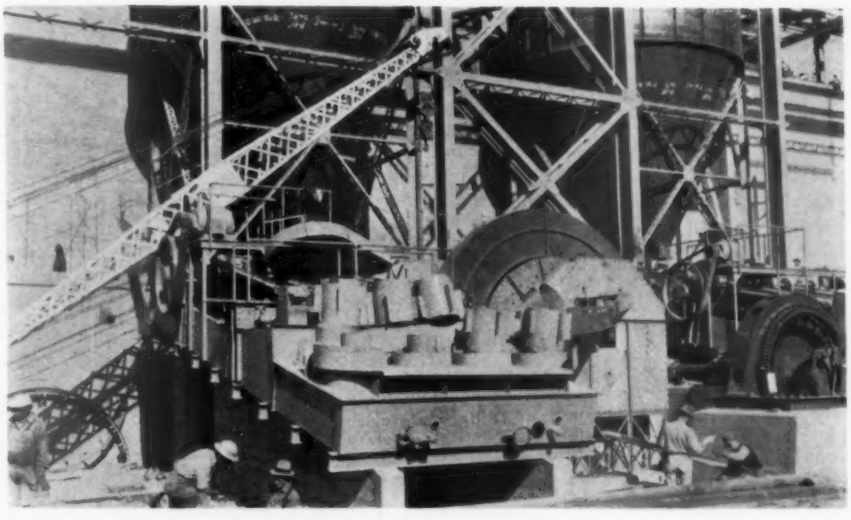


Two of the Permanente finish-grinding mills with their separators.

Company at its Oglesby, Illinois, plant. The electric locomotives and cars formerly used were replaced by 3 Autocar truck-tractors, each hauling a Gar Wood semi-trailer and a 4-wheeled trailer. A fourth tractor is kept in reserve. All the trailers and semi-trailers have 2-way side-dump bodies of 22½ tons capacity. The tractors are powered

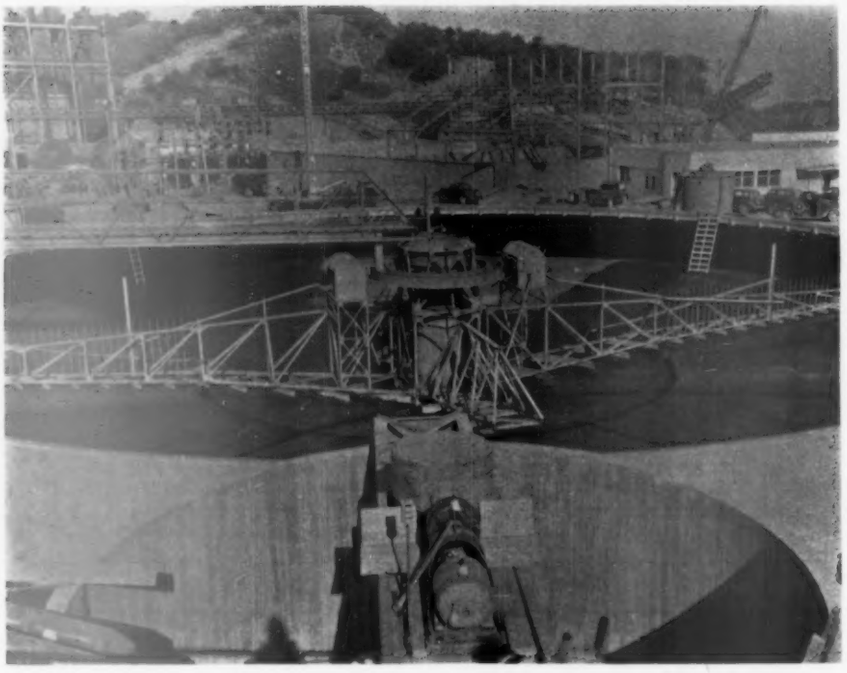


The Permanente mill department with raw equipment in foreground. Slurry-blending tanks are at right of conveyor to sugar-rock plant.



One of the two multiple-zone classifiers which operate in closed circuit with the raw mills in the Permanente plant.

Looking over the Permanente kilns at the electrical precipitator building and stack. At left above is the cement-rock storage conveyor.

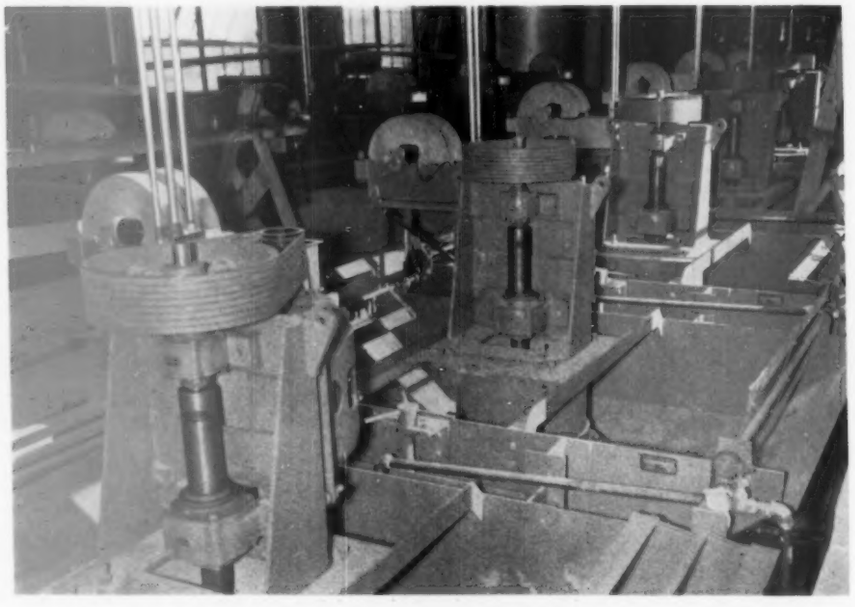


One of the two 150-foot diameter thickeners in the Permanente plant with turbo-mixer in foreground.

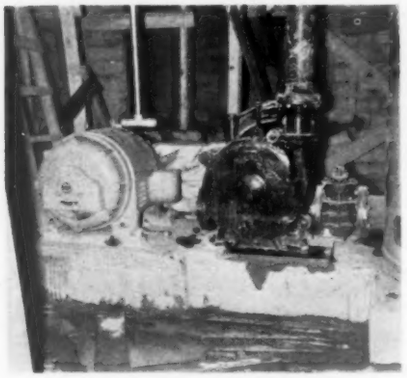
by 150-hp. Cummins Diesel engines. These trains operate at 28 miles per hour empty and 20 miles per hour loaded, and each handles 120 tons per hour over a 2-mile round trip, and with a fuel consumption of only 3 gallons per hour. This system has more than doubled the shovel output in the quarry.

Earlier in the year 3 Autocar trucks with Gar Wood dump bodies were purchased to haul away overburden at this quarry after several other methods had been tried. The trucks are 6-wheeled units with Cummins 150-hp. Diesel engines, dual-driven rear axles, 12 speeds forward and air brakes. The 2-way side-dump bodies, with a water-level capacity of 11½ cubic yards, have automatic down-folding side gates which cast the load far out beyond the wheels and dumping is done while the truck is running at the rate of 15 miles per hour. At present a round trip of 4,400 feet is being made. This equipment has greatly increased the capacity of the shovel used for loading.

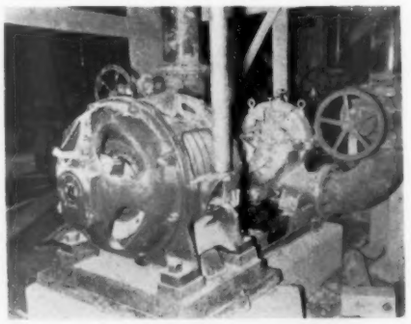
At the company's Cape Girardeau, Missouri, plant the installation of facilities for completely revamping the method of raw mixing is nearing completion. The new system will make it possible to vary the composition at will by a dry method and can be switched easily from one type of cement to another. The component raw materials are first analyzed before they are combined so that the exact composition of a mix is always known. With this system the more important components of a mix can be kept constant within a few hundredths of one per cent. In obtaining a mix no ingredients are removed, instead the needed ingredients are added in the required quantities. In the process 6 Richardson automatic scales of special design are used in much the same way as in blending ingredients in glass-making practice.



A view inside the Permanente cell-house showing some of the cells used in the flotation process.



One of the slurry pumps under the thickeners at the Permanente plant.



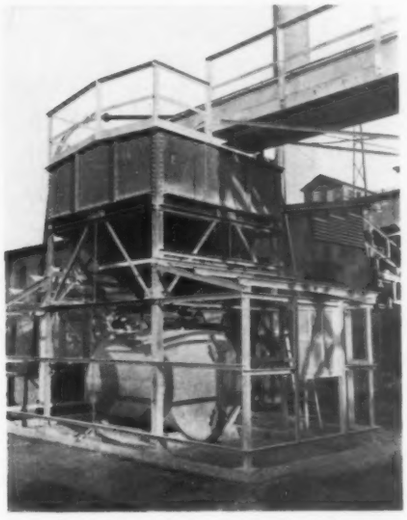
One of the pumps used for recirculation in the Permanente cell house.

At the Oglesby plant work has been started on the replacement of old corrugated metal roofing and siding with corrugated cement asbestos. Ten barges have also been added to the fleet which will be used chiefly for hauling coal. Improvements for 1940 will include the construction of 2 additional storage silos at the Memphis, Tenn., packing and storage plant.

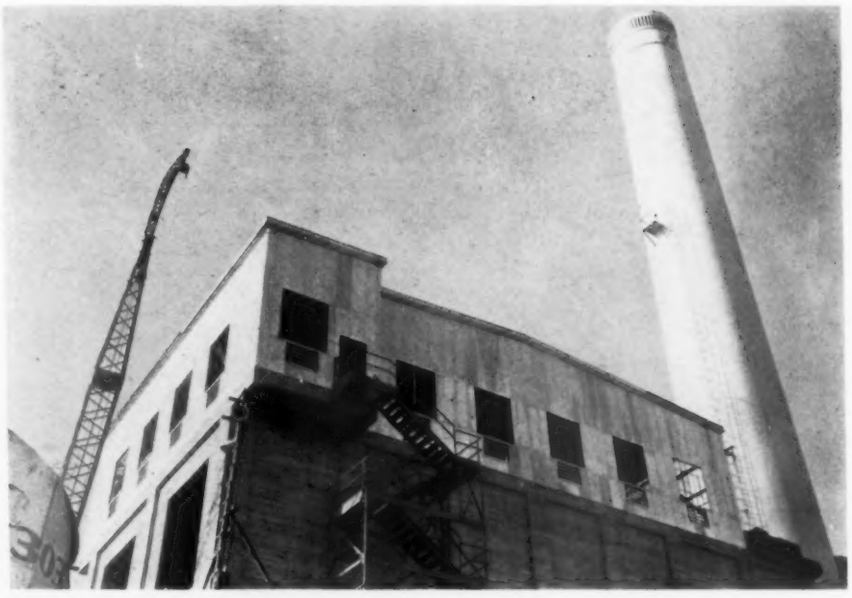
An earlier addition to the company's fleet was the Diesel towboat Nicholas Duncan. (*P&Q*, December, 1939, page 33.) This 130-foot vessel is driven by 2 Atlas Imperial Diesel engines of 800 horsepower through twin-screw propellers. At present this boat

is towing coal from East Liverpool, Illinois, to the Oglesby, Illinois, plant. Later it will also be used for towing cement. The towboat is named after the late Nicholas W. Duncan, a former chairman of the board of the Marquette Cement Manufacturing Company.

The Lehigh Portland Cement Company completed extensive improvement programs at its Union Bridge, Maryland, and Alsen, New York, plants. At the Union Bridge plant 6 new buildings were erected and considerable new equipment was installed. The new buildings erected included cement-storage silos, limestone and shale storage, a power plant and a new mill building. New equipment included Buell and Norblo dust collectors. At Alsen the job consisted of rehabilitating a plant which had not been operated for many years and converting it from the dry to the wet process. Twenty new silos 30 feet in diameter and 75 feet high were built and many of the old structures were modernized. New equipment installed included a Cottrell electrical precipitator. During the year 10 new silos were built at the Sandt's Eddy, Pennsylvania, plant and a Buell dust collector was installed.



The conveying system which returns flue dust to kilns in Louisville plant.

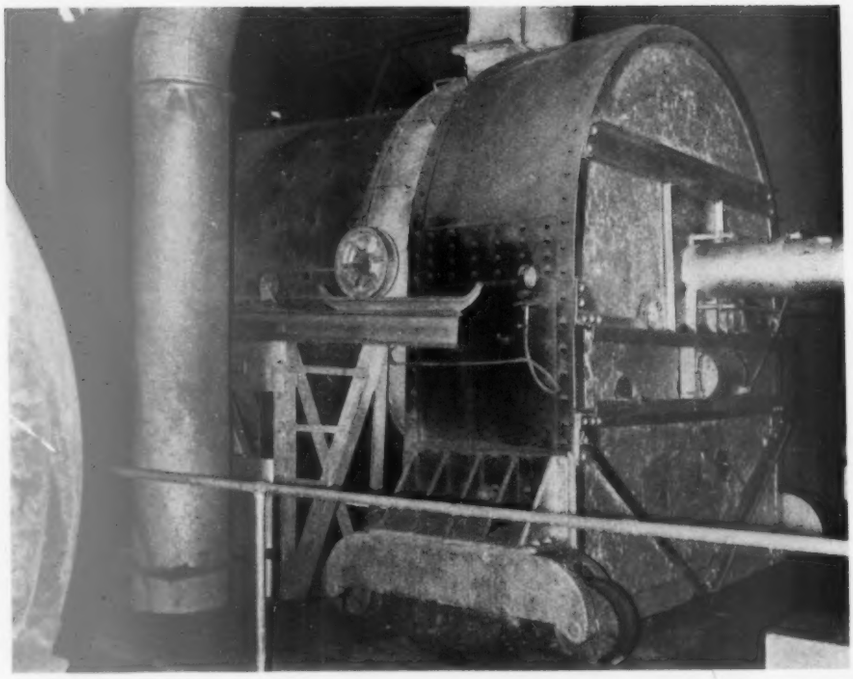


Looking up at the nearly-completed electrical precipitator and the kiln stack at the new Permanente Corporation plant.

The Santa Cruz Portland Cement Company has another important improvement program under way at its Davenport, California, plant. Two Lepol kilns are being installed and 4 of the 18 old 125-foot rotary kilns have been removed to make room for them. The Lepol kilns will have 11-foot 3-inch by 113-foot rotary sections and will each have a capacity of 2,250 barrels daily. Four new 15-foot by 53-foot concrete silos are being built to store and blend raw material feed for these kilns.

The company has just completed the construction of 6 new cement-storage silos with a total capacity of 140,000 barrels. These will supplement the four silos now used for loading bulk cement into boats. A small high-silica cement packhouse is being built and a total of 10 Sly and Norblo dust collectors will

The new primary crusher building in Dewey Portland Cement Company quarry before it was inclosed. Dumping hook is shown engaged to trailer body.



One of the six new short-plate type recuperators installed in the plant of the Medusa Portland Cement Company at Dixon, Illinois.

One of the three trains of 22½-ton semi-trailers and trailers which haul stone to the Oglesby, Illinois, plant of the Marquette Cement Manufacturing Company.

be installed in various parts of the plant.

The Southwestern Portland Cement Company's plant at Victorville, California, can usually be counted on to offer some interesting improvements. A few months ago the No. 2 packhouse was rebuilt and bucket elevators were installed to return spillage from each of the two pairs of packers to their feed bins. Norblo cloth-tube dust collectors were also installed. Reversible shuttle conveyors were also installed to permit loading on either side of the building into trucks or cars. To facilitate truck-loading a system has also been installed which moves the trucks slowly forward at the rate at which they are loaded. The No. 1 packhouse has just been rebuilt in the same manner. This company, one of the first to adopt Diesel-powered trucks, now has a fleet of 18 trucks with Cummins engines delivering cement from this plant.

The crushing department has also been improved. A new Pennsylvania reversible hammer-mill replaced an old machine and this is preceded by a Robins roll grizzly and pan feeder. Early in the year 2 Traylor TY crushers were installed to crush clinker before it is fed to the mills. These replaced roll crushers. A new quarry is also being opened with 4,000 feet of track and a loading dock from which the quarry trucks discharge into cars for the plant.

Other improvements which will be in operation in February are expected to increase the kiln capacity. Two 80-foot diameter Dorr thickeners will be used for thickening and blending slurry and can be used for different cements if desired. In addition to reducing the slurry moisture content these 12,000-barrel tanks will triple the present slurry storage capacity. Two Morris pumps will be used for slurry circulation and two for kiln feed. A Fuller rotary compressor will supply air for agitation. Leeds & Northrup Ray-O-Tubes have been installed on the three kilns to keep the range of burning temperature at a minimum.

Early in 1939 the Keystone Portland Cement Company, Bath, Pennsylvania,

The 14-foot dust-collector in the Louisville plant which returns drier dust to raw-mill stream.

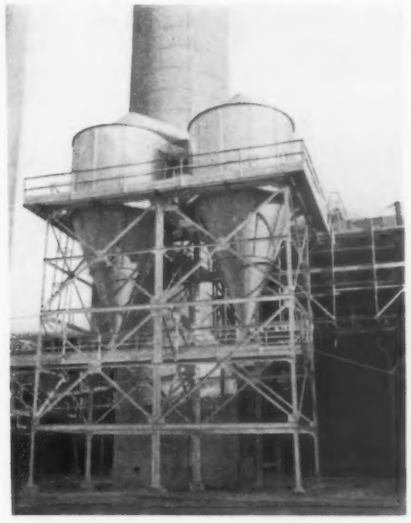
installed two Fuller clinker coolers, replacing the old coolers which formed an extension of the kiln shell. These coolers now form the burning zones of these two kilns. This installation was made with a minimum of trouble and expense as it was possible to design the coolers for discharge at right angles to the kiln and they were small enough to fit in the tunnel housing the drag chain which carries the clinker away to storage. These coolers reduce clinker temperature from 2400 degrees down to 350 deg. F. and have considerably reduced autoclave expansion.

The National Portland Cement Company is installing a Separation Process

One of the three side-dump trucks which haul away overburden at Marquette quarry.

Company Breerwood flotation system in its plant at Brodhead, Pennsylvania.

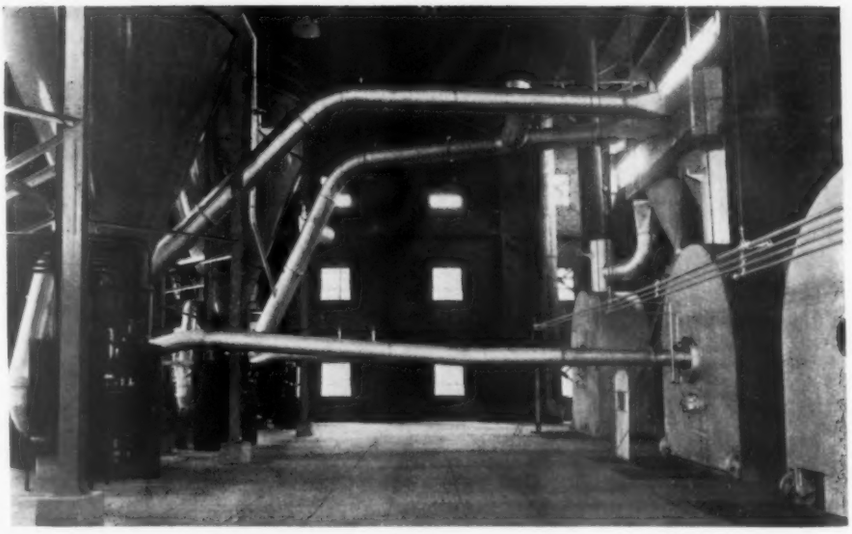
The Yosemite Portland Cement Company, Merced, California, was added in 1939 to the list of companies which have gone from open to closed-circuit grinding. Two 7-foot by 26-foot compartment mills were formerly used singly to grind standard cement and in series for high-early-strength cement. The volumetric feeders for these mills have been replaced by two pairs of Merrick "Feedoweights." A 16-foot Raymond separator has been installed and this is operated in closed circuit with both mills for standard cement. For high-early-strength cement the "rejects" go back to the first mill and the separator fines are fed to the second mill, the product of which is finished cement. A 5-compartment Norblo automatic dust-collector was installed in the finish-grinding department. The kilns were relined and reset. At the quarry new cables were laid and a new crusher and a weigh batcher were installed.



The collectors which reclaim dust from two 150-foot kilns in the Louisville plant.

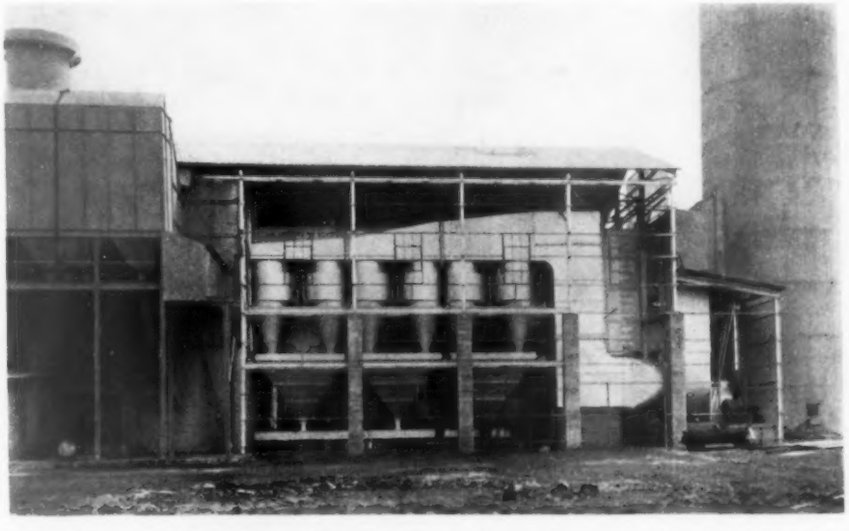
A series of improvements have been made to the Devil's Slide, Utah, plant of the Union Portland Cement Company, a subsidiary of the Ideal Cement Company. Those completed during the past year included the replacement of the old 30-cycle motors with new 60-cycle motors and gear-motors. A 16-foot Raymond separator with a double Whizzer was put in closed circuit with the raw-material grinding machines and a 16-foot Sturtevant separator with the finish-grinding mills. Redler conveyors were installed to feed the kilns. A Link-Belt drag-chain has replaced a rotary cooler on one of the four kilns.

The Arkansas Portland Cement Company, Okay, Arkansas, another Ideal Subsidiary, closed a contract to construct a 75-mile pipe-line from the northern Louisiana oil fields to the plant.

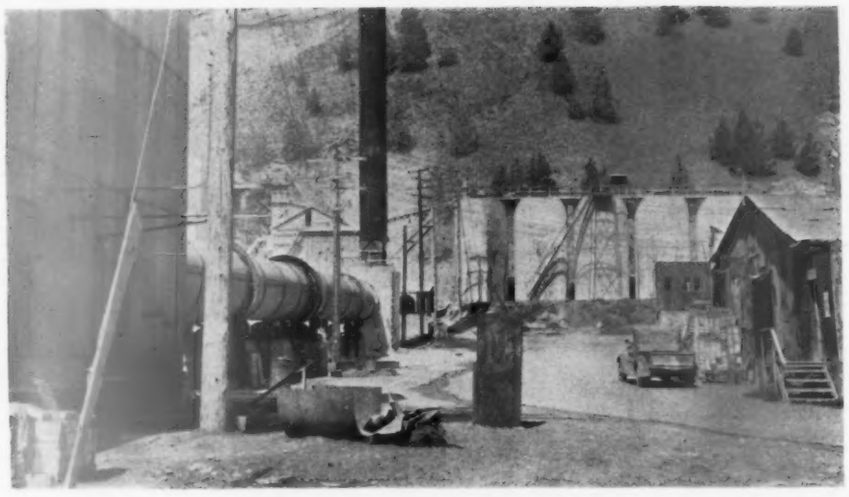


The two new direct-firing bowl mills installed by the Lone Star Cement Corporation, Limedale, Indiana, to fire three kilns.

The discharge end of one of the new clinker coolers and the drag-chain in the plant of the Keystone Portland Cement Company.



The cyclone-type dust-collectors which reclaim flue dust at the plant of the Kosmos Portland Cement Company, Kosmosdale, Kentucky.



The five new slurry-storage and blending tanks at the Orofino, Idaho, plant of the Washington-Idaho Lime Products Company.

The new 130-foot, twin-screw Diesel towboat added to the fleet of the Marquette Cement Manufacturing Company.

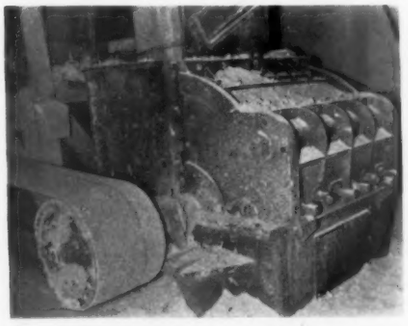
The Kosmos Portland Cement Company, Kosmosdale, Kentucky, installed Buell dust-collectors ahead of its kiln stack. Many other improvements are being made in this plant.

The Medusa Portland Cement Company in 1939 completed a new storage and packing plant at Holland, Michigan. This consists of 9 reinforced-concrete storage silos, 80 feet high and 16 feet in diameter with a combined capacity of 40,000 barrels and a pack-house. Bulk cement is carried by self-unloading boats from the Manitowoc, Wisconsin plant of the Manitowoc Portland Cement Company, a Medusa subsidiary. (*P&Q*, July, 1939, page 35.)

A series of improvements have also been made over a period of years at Medusa's plant at Dixon, Illinois. (*P&Q*, July, 1939, page 59.) Latest of these was the installation of short-plate Type F Vanderwerp recuperators on the 6 kilns. This installation resulted in a considerable increase in the capacity of the finish-grinding department. Another Type F Vanderwerp recuperator was installed in the York, Pennsylvania, plant and 4 were installed in the Bay Bridge, Ohio, plant. A Buell dust-collector was installed at York.

At the Crescentdale, Pennsylvania, plant locomotives and cars and an overhead tramway were replaced by 3 White Diesel trucks, each hauling a 14-ton Truck Engineering Company trailer. It is reported that 4 Raymond direct-firing bowl mills are to be installed in this plant.

The Louisville Cement Company has had under way for several years an improvement program which has affected nearly every department of the plant. The latest installation consisted of flue dust-collectors and pumping systems to return the dust to the system. A Norblo 15-foot 4-inch diameter H. E. L. S. cyclone-type collector follows the waste-heat boiler which is connected to two 150-foot kilns and dust is returned to



The new hammer-mill secondary crusher in the plant of the Washington-Idaho Lime Products Company.

the kiln-feed hopper by a Robinson air-activated pumping system. The gas from 4 other kilns goes to another waste-heat boiler, which is followed by three 14-foot Norblo H. E. L. S. collectors. A Fuller Kinyon pump returns this dust to the kiln feed. Another 14-foot H. E. L. S. collector follows the rock drier, and screw-conveyors return this dust to the raw material flow. (*P&Q*, July, 1939, page 73.)

The Universal Atlas Cement Company is reported to have begun, at Hudson, New York, the erection of additional cement storage silos which will have a capacity of 150,000 barrels. A Marion 3-cubic yard electric shovel was installed in the company's Hannibal, Missouri, quarry. Multiclones were installed at the Waco, Texas, plant.

New cement storage and packing plant of the Universal Atlas Cement Company with self-unloading boat at right.

During the year the Universal Atlas Cement Company built new cement storage and packing plants at Green Bay, Wisconsin, and Muskegon, Michigan. The Muskegon plant consists of 5 reinforced-concrete silos with a combined capacity of 30,000 barrels, and a packing plant *(P&Q,* August, 1939, page 17.)

The Green Bay plant is similar in design. *(P&Q,* July, 1939, page 35.)

The Alpha Portland Cement Company has announced plans for the construction of 18 new storage silos at its Cementon, New York, plant. Ten of these silos will be used for the storage of cement and these will have a capacity of 65,000 barrels. The other 8 silos will be used for blending raw materials and these will have a capacity of 5,000 tons. Nine other silos were recently completed at this plant.

The Lone Star Cement Corporation made a number of improvements to its plants during the year. At Limedale, Indiana, the coal drying and grinding department was replaced by two direct-firing bowl mills which serve the three

Conveyor feeding raw materials to tube-mill, Union Portland Cement Company, Devil's Slide, Utah.

240-foot rotary kilns. *(P&Q,* November, 1939, page 32.) Coal is unloaded from cars into a track hopper feeding a belt-conveyor. Surplus coal overflows into a stock-pile which feeds the same conveyor. A magnetic pulley removes tramp iron as the coal is discharged on a second belt-conveyor, from which it is elevated into 35-ton bins over the coal mills. A manually-controlled gate apportions the fuel about equally to the two bins, and a Bindicator on one of the bins thus controls both bin levels. Two bowl mills and a Buell dust collector are being installed at the Spocari, Alabama, plant.

At the Houston plant a new shell-unloading derrick and raw-material storage are being built and these will be completed early in the summer of 1940. A 3-cubic yard Marion 4121 electric shovel was placed in service at the Hudson, New York, quarry.

In 1935 a cement plant of 240-barrel daily capacity was built by the Washington-Idaho Lime Products Company at Orofino, Idaho. At that time the plant included only the equipment absolutely necessary for the production of cement. Since then many improvements have been made in the operations and considerable equipment has been installed to increase operating efficiency. Among the recent improvements is a row of 5 slurry-storage and blending tanks equipped for mechanical-and-air agitation. A Williams hammer-mill replaced a gyratory secondary crusher formerly used. A new gypsum department, consisting of a storage bin and a weighing feeder which is electrically interlocked with the finish-grinding mill, has been added.

The Trinity Portland Cement Company bought and dismantled the plant of the American Portland Cement Company at Foreman, Arkansas, which was built ten years ago but never operated. The kiln, two grinding mills and a cooler have been shipped to one of its Texas plants for future service.

The Glens Falls Portland Cement Company, Glens Falls, New York, installed Vanderwerp recuperators on two 250-foot kilns.

The Diamond Portland Cement Company, Middle Branch, Ohio, has under construction a new reinforced-concrete clinker-storage building.

The Missouri Portland Cement Company made many improvements to its plant near St. Louis, Missouri. Trucks replaced locomotives and cars in the quarry. A Cottrell electrical precipitator and considerable other equpment was installed in the plant.

The Peerless Portland Cement Company installed Western Precipitation Corporation Multiclones in its Detroit, Michigan, plant.

Crushed Stone *(from page 80)*

Diesel engines and semi-trailers were purchased to haul rip rap a distance of 77 miles to the new Barnegat jetty. From 15 to 20 tons of stone is hauled per load.

Two Easton truck-trailers are being installed by the River Products Company, Iowa City, Iowa. Other new equipment included a 330-foot Quaker City conveyor belt, a Universal roll-crusher and a Simplicity screen.

The new 30-inch by 40-inch hammermill installed by the Columbia Quarry Company.

The Paraffine Companies, Inc., Emeryville, California, installed 6-foot and 8-foot Raymond mechanical air-separators with single Whizzers for classifying slate and trap rock.

The Pacific Limestone Products Company, Santa Cruz, California, spent $5,000 for equipment to increase the output of poultry grit.

A. N. Farnham, New Haven, Connecticut, added a set of steel bins of unique design which eliminate the necessity of chutes. Other new equipment included a 4-foot by 10-foot Seco screen.

Henry Moss installed a new Diamond jaw crusher and conveyor, a 3-foot by 8-foot Diamond vibrating screen and an 85-hp. Cummins Diesel engine in his plant at Georgetown, Kentucky.

"Pinite" Used to Line Rotary Cement Kilns

A large number of secondary minerals derived from the alteration of feldspar, nepheline, scapolite, spodumene, piolite, etc., are classed as "pinite." In composition, pinite closely corresponds to muscovite, essentially a hydrous silicate of alumina and potash. Agalmatolite is a massive pinite resembling steatite or pyrophyllite in appearance. Other varieties resemble sericite. As early as 1933, a large deposit of material identified by P. F. Kerr as "pinitized tuff" was discovered on the east side of the Humboldt Range near Rochester, Nevada. According to Oliver C. Ralston of the Bureau of Mines, who recently visited the deposit, Vernon R. Sullivan, who optioned the claims and undertook preliminary development, began shipments to the Stockton Fire Brick Company a year or two ago. During the first 8 months of 1939 this company mined and delivered to its plant in Pittsburg, California, at least 14 cars of the material, which is used principally in rotary-kiln linings at cement plants.

The unusually long rotary kilns erected for the new Permanente cement plant near Los Gatos, California, are lined with pinite, which also may be used eventually for pebble-mill grinding media and liners.

The deposit, as described by Ralston, is 25 miles from railroad at Oreana, near the ridge separating the south fork of the American Canyon from the main valley, previously reported to be exposed at a length of 450 feet and a thickness of 40 feet, dipping into the hill. The enlarged quarry openings indicate that the footwall is nearly vertical and only the hanging wall dips into the hill at a low angle, thus widening rapidly with depth. Both walls are silicified tuff.

POZZUOLANAS and POZZUOLANIC CEMENTS

By DR. GABRIEL A. ASHKENAZI

IN recent years an increased interest in pozzuolanic cements can be noticed. The reasons for this are manifold. Apart from the pure commercial purpose to find a market for the pozzuolanic materials, the insufficient resistance of Portland-cement concrete to the action of aggressive waters and the better durability of structures made of cement-pozzuolanas mixes are, apparently, the principal reasons why so many investigations have been made in various countries during the past five years.

As pozzuolanic materials we consider those of natural origin only, namely: the proper pozzuolana, the pumicite, trass and tuff—all of volcanic origin—and kieselguhr and similar substances consisting of the fossil remains of diatoms. Many authors include in the category of pozzuolanic materials blast-furnace slag. This is not correct, inasmuch as the composition and the properties of slags and pozzuolanas are different. Pozzuolanas are composed chiefly of silica and alumina with some amount of iron oxide and a very low proportion of lime. Blast-furnace slags, however, contain a considerable amount of lime and possess a decidedly basic character. Besides, the behavior of slags and pozzuolanas regarding their hydraulic properties is different; whereas blast-furnace slags possess active hydraulic properties, those of pozzuolanas have to be de-activated.

The difference in the typical chemical composition of blended cements made by mixing of 70 per cent. of standard Portland-cement with 30 per cent. of blast-furnace slag and pozzuolanic materials, respectively, may be illustrated by the following approximative data: Blast-furnace slag cement: SiO_2: 24%, Al_2O_3: 8%, Fe_2O_3: 3%, CaO: 59%. Pozzuolanic cement: SiO_2: 30%, Al_2O_3: 9%, Fe_2O_3: 6%, CaO: 48%. (The data comprise the contents of the principal oxides only.)

Considering the aggressive waters injurious to Portland cement, this author does not include sea water in this category. He does not think that the action of sea water affects the durability of properly prepared concrete, made of correctly produced Portland cement.

The French cement school advanced the theory that the deterioration of cement construction exposed to the action of sea water is caused by the formation of calcium-sulpho-aluminate. Candlot[1] was the first who prepared and described this compound 50 years ago. Since then many scientists devoted their work to the studies of "cement bacillus", a name which has been given to this compound by Michaelis,[2] who discovered it simultaneously with Candlot. According to the latest investigations, calcium-sulpho-aluminate has the formula 3 Cao. Al_2O_3. x $CaSO_4$. y H_2O, where x and y vary with the condition of the preparation: x from 0 to 3, y from 10 to 32.[3]

It was the French authority, Le Chatelier[4], who worked out the most supported theory of the destructive action of sea water on cement. He emphasized that the cement constituents react with the magnesium salts of sea water, producing the chloride and sulphate of calcium. The sulphate reacts with the hydrated calcium aluminate to form calcium-sulpho-aluminate. The latter, due to its crystallization with a large amount of crystal water, takes up a larger volume than the initial constituents of cement, thus producing a considerable strain which causes a dangerous deformation of the structure. Although Le-Chatelier's theory has a great number of adherents, it conflicts with many experimental data. It has been established that calcium-sulpho-aluminate is decomposed by sodium chloride and magnesium chloride. Nitzche[5] showed that this compound could not be found in concrete blocks immersed in sea water. Bates, Phillips and Wig[6] are of the opinion that calcium-sulpho-aluminate does not cause the deterioration of concrete in solutions of the chlorides and sulphates of sodium and magnesium. According to the same investigators, "there is no apparent relation between the chemical composition of a cement and the rapidity with which it reacts with sea water," and they conclude that the physical qualities of the concrete, rather than the chemical composition of the cement, determine the resistance to disintegration. It would unnecessarily enlarge this article if we intended to relate the numerous objections to Le Chatelier's views; suffice it to say that innumerable constructions made of Portland cement proved their ability to withstand the action of sea water for a good many years, and in cases where the cement concrete failed the causes may be found in other factors. The chemical action of salts contained in sea water plays a certain part in the deterioration of the surface of the structure. Assuming that magnesium salts of sea water react on calcium hydroxide of hydrated cement, this reaction results in the formation of magnesium hydrate. Although this compound has no cementitious value, it is practically insoluble in sea water. Such a precipitation of magnesium hydrate will fill up the pores of concrete and make it less permeable to a further action of sea water, provided that the concrete has been originally made of a dense structure. Moreover, in the long run the deposition of moss, shells and other natural elements of sea water makes the coating produced by the chemical reaction of the sea salts on cement more impervious and resistant.

Numerous investigations established that the physical properties of concrete and not the chemical reaction between the hydrated compounds of cement and the salts of sea water comprise the ultimate factors affecting the durability of cement constructions in sea water.

Thus, excluding sea water from the category of aggressive solutions, a series of liquids are liable to destroy concrete: ground water containing dissolved carbon dioxide, peaty, sewage, alkaline,

[1] Candlot. Bulletin Société d'Encouragement de l'Industrie, 73 (1890), p. 685.

[2] Michaelis. Proceedings Institute Civil Engineering, 107 (1892), p. 370.

[3] Koyanagi. Zement (1931), No. 48.

[4] Le Chatelier. International Association for Testing Materials, 1906, Problem 31.

[5] Nitzche. Zeitschrift angew. Chemie, 32 (1919), 21.

[6] Bates. Phillips and Wig. Technological Papers, U. S. Bureau of Standards, No. 12, Nov. 1912.

and, in general, all waters containing compounds capable of reacting with lime to form soluble products are injurious to cement concrete and mortar. In many cases this danger can be diminished or even removed by using as binding material, instead of Portland cement, a mix of cement and pozzuolanic substances.

The fact that pozzuolanas can be used in hydraulic construction was known before anybody dreamed of producing Portland cement. Italian investigators found mortar made of pozzuolanas and lime as far back as about 60 A.D. Similar types of mortar used by the Romans have been shown to possess a high degree of durability. The use of pozzuolana-slaked lime mixes as hydraulic binding material is certainly uneconomical at present and does not comply with modern constructional methods. Pozzuolana-lime mortars harden extraordinarily slowly at ordinary temperatures and the hardening proceeds only in the presence of moisture. In what way hydrated lime reacts with pozzuolanas is not exactly known; however, there are indications that the compounds 3 CaO.2 SiO_2.aq. and 4 CaO.Al_2O_3.aq. are formed. According to Dr. W. Büssem,[7] there is evidence to indicate the formation of lime-alumina silicates, such as 2CaO. Al_2O_3.SiO_2.aq. and 3CaO.Al_2O_3.2SiO_2. aq. These compounds, however, have not been proved to be especially resistant to the attacks of aggressive solutions, thus leaving open the question about the causes of the resistance of pozzuolana-lime mortars in the presence of chemical agents.

There is some divergence of opinions about the properties of Portland cements blended with pozzuolanic materials, but, in general, the following statement made by P. H. Bates[8] characterizes well the condition. He says: "the pozzuolanic cements have the outstanding properties of low early strength, but very steady gain in strength and an excellent resistance to aggressive waters after they have acquired a certain part of their ultimate strength". It is unquestionable that the admixture of pozzuolanic matter improves the durability of cement structures in corrosive solutions. It is especially true in respect to solutions of sodium and calcium sulphates. The behavior of pozzuolanic cements in magnesium-sulphate solutions is less satisfactory; however, they show a much slower rate of disintegration than the unblended cements. Somewhat confusing is the behavior of pozzuolanic cements in magnesium-chloride solutions. In this case specimens made of straight Portland cement showed a better resistance than those of blended cements. The behavior of pozzuolanic cements related here represents a deduction for numerous facts given in the literature. It is to be pointed out, however, that the correctness of this statement can not be generalized in regard to all pozzuolanas-cement mixes. Strange as it may seem, different brands of Portland cement mixed with the same pozzuolanic material may show quite different behaviors with respect to their resistance to corrosive waters; on the other hand, pozzuolanic materials of a similar composition, when mixed with the same cement, may act in a different way.

Our knowledge of the action of lime on pozzuolanas is insufficiently developed; we know still less about the reactions between cement and pozzuolanic admixtures. This problem is still a matter of controversy and the opinions fluctuate between two theories. The familiar theory of chemical action assumes that the silica of the pozzuolanic materials combines with the calcium hydroxide of cement to form compounds which are more stable and resistant to the attacks of corrosive solutions. The physical theory attempts to prove that the effects of pozzuolanas on cement depend upon the fact that the naturally fine divided pozzuolanic substances fill the existing micro-pores in the cement concrete and mortar, thus increasing the density of the structure and impeding the access of injurious liquids to the mass of the construction. It has to be admitted that many considerations support the probability of mechanical action only.

The chemical action of pozzuolanic admixtures is based on the presence of "active silica". The evaluation of pozzuolanas is usually determined by means of lime-mortar tests indicating the degree of their ability to harden with hydrated lime; or the "activity" of pozzuolonas is estimated indirectly by determining the solubility of their silica in acid or alkaline solutions. It is an established fact, however, that "although lime-mortar tests are of value when considering lime-pozzuolana mixes, they do not afford a satisfactory indication of the value of pozzuolana for the use in mixtures with Portland cement".[9] The same is true with respect to the solubility tests. The present writer tested a series of pozzuolanic materials containing a considerable amount of soluble silica and came to the conclusion that many of them did not improve, when added to cement clinker, the resistance of blended cements to aggressive waters. On the other hand, the writer's experience with cement blended with very fine ground sand containing 98 per cent. of inert silica gave quite satisfactory results regarding the behavior in solutions of 1 to 2 per cent. sodium sulphate in water. According to F. R. McMillan and T. C. Powers,[10] "precipitated silica, a product composed almost entirely of silica in active state, proved to be of little or no value as an admixture in concrete, though it exhibited pronounced activity in combining with calcium hydrate". The fact that siliceous earth containing 50 per cent. of active silica does not combine chemically with hydrated lime of cement has been recently shown by the following experiment. The hydration of Portland cement is a chemical process, consequently this chemical reaction is reflected in the course of the electrical conductivity of the cement paste. If the active silica of the admixture should react with the calcium hydrate set free during the process of hydration, this reaction would influence the electric conductivity of the paste. The tests showed that the addition of active, as well as of inert, admixtures decreases the conductivity of the paste. The curves of conductivity, however, do not differ from the conductivity curve of straight cement. The observed decrease in conductivity of the paste of blended cements is not due to an additional chemical reaction, because in such a case the character of the curves would be substantially changed; the decrease is caused by the adsorption of a certain amount of gaged water by the admixtures. And, in fact, another test showed that the course of conductivity in a paste made of cement blended with 25 per cent. of pozzuolana and 33 per cent. of gaging water was identical with the course of a paste made of straight cement and 21 per cent. of mixing water.[11]

In order to stress the fact of contradictory results, when testing different pozzuolanic admixtures, we will relate another experiment carried out in the Danish State Testing Laboratory in Copenhagen.[12] The experiment was made with a Danish eocene diatomaceous seawater deposit rich in silica and an ordinary Portland cement. The admixture was ground to a residue of 4 per cent. on a sieve with 5,000 meshes per sq. cm., its content of soluble silica, determined by treating with 3 per cent. hy-

[7] Büssem. *X-rays and Cement Chemistry*, paper, presented at the International meeting on *The Chemistry of Cements*, Stockholm, 1938.

[8] Proceedings A.S.T.M. vol. 33 (1933), p. 466.

[9] F. M. Lea. Cement and Cement Manufacture, June, 1937, p. 170.

[10] Journal American Concrete Institute, vol. 34, Nov.-Dec., 1937, p. 129.

[11] A. Snamansky. Journal of Applied Chemistry, Jan., 1937, pp. 52-67.

[12] J. E. Loventhal. Cement and Cement Manufacture, March, 1932, p. 87.

drochloric acid, was only 2 per cent. Twenty parts of this material were mixed with 80 parts of cement, and the amount of soluble silica, determined in the same way, was found to be 16.4 per cent. The blended cement was gaged with water, test pieces were molded and stored in distilled water for a period of 28 days, 3 and 12 months. The amount of soluble silica was then determined, and was found to be 19.6, 22.3, and 23.6 per cent. respectively after 28 days, 3 months and 12 months. These results show that a part of inert silica of the admixture was transformed into a soluble form. A calculation shows that during the period of curing the proportion of soluble silica in the admixture has increased from 2 per cent. to 18.1, 33.5 and 40.8 per cent. respectively. Such a change can only be explained by the admission that a certain chemical reaction took place between the inactive (insoluble) silica of the admixture and calcium hydrate of cement.

Yet, this writer is of the opinion that physical and mechanical action of the pozzuolanic admixtures plays the most important rôle in improving the resistance of the cement matrix. It is a well established fact that cement concrete shows in many cases a better behavior if a certain amount of fine particles has been added to the aggregates. Not long ago it was thought that the aggregates should be absolutely free from fine, dust-like particles. Consequently, an excessive washing of aggregates has been applied. At present it is agreed that the quality of concrete may be unfavorably influenced by the absence of fine particles just as much, as by an excess of them. Finely-ground burned clay, sand, even limestone, added to the aggregates in proportions of 10 to 20 per cent. of the weight of the cement used augments the workability, reduces the segregation, improves the density of concrete and, in some cases, increases the tensile strength, especially in concrete made of lean mixtures. The pozzuolanic materials containing a considerable proportion of naturally produced infinitesimal powder will have a still more favorable effect. There are, however, some facts which can not be explained when admitting a pure mechanical action of pozzuolanic admixtures on cement concrete. Whereas, the addition of sand or other inert materials in proportions not exceeding 20 per cent. of weight of the cement does not essentially affect the early strength, or may reduce the strength of blended cement in proportions corresponding to the added amount of the admixtures, the pozzuolanas-cement mixes are characterized by a much greater decrease in early strength than that which could be expected, considering the percentage of the admixed pozzuolanas. So, for example, according to the tests made by the Engineering Material Laboratory of the University of California, the replacement of cement content with 20 per cent. of pumicite resulted in decreasing the compressive strength of mortar in the following way. The 3-days' specimens made of blended cement showed 44 per cent. less than those made of straight cement. The 28-day ones showed a decrease of 35 per cent., and only after one year of most curing the strengths of pumicite-portland cement mixes became "substantially equal to those of straight cement".[13] This specific decrease in strengths can not be caused by a mechanical action only. In this writer's opinion, it can not be connected with chemical reaction, because the very slow rate of reaction between the active silica of pozzuolanas and calcium hydrate of cement can not account for such a great decrease in strengths at the early age of 3 days. It has been established, however, that pozzuolanas possess pronounced absorbent properties; therefore, it is probable that the heavy decrease in early strengths of pozzuolanic cements is due to the absorption of hydrated lime by the pozzuolanas. The partial withdrawing of calcium hydroxide from the hydrated cement particles may violate the process of hardening at early ages. In time, with the end of absorption, and with the development of chemical reactions of silica on calcium hydrate, the disturbed process of hardening is restored and the blended cements ultimately acquire the strengths of straight cements.

The writer does not intend to give a complete account of the properties and action of pozzuolanas. The mentioned facts, however, are sufficient to show that the results of numerous investigations are contradictory and can not be linked into a coherent theory. The reasons for this lie partly in the difficulties of investigating the silicates, but chiefly in the fact that the action of pozzuolanas on cement comprises different phenomena: the pure mechanical effect of solidification of the cement-concrete structure; the physical action, such as absorption of calcium hydroxide; and the chemical reaction between the silica of the pozzuolanas and the calcium hydrate of the cement. Regarding this chemical reaction the writer wishes to state that, despite some experiments whose results raise some doubts as to the very existence of such a reaction, it is very probable that it actually takes place. It is generally assumed that cement concrete and mortar can not withstand the attacks of corrosive solutions because calcium hydrate, formed during the process of the hydration of the cement, is soluble in these solutions. The favorable action of pozzuolanas is caused by the fact that their active silica combines with calcium hydrate forming an insoluble cementing material. It is established, however, that in the reaction of pozzuolanas and calcium hydroxide calcium hydrosilicates and calcium hydroaluminates are produced. These compounds do not distinguish themselves by a particular resistance to the attacks of aggressive solutions. In fact, it has been shown that calcium hydrosilicates are decomposed by corrosive solutions into SiO_2 and $Ca(OH)_2$. In consequence with this a new explanation of the better durability of pozzuolanic cements has been advanced.[14] The improved resistance of blended cement is not due to the formation of stable calcium-silica compounds. The latter represent an intermediate product only and are decomposed by the corrosive agents. Calcium hydrate is dissolved by the attacking solutions; silica, however, remains in the form of a gel which possesses cementing properties. It is this precipitated silica gel which provides the cement structure, weakened by the previous attacks of aggressive solutions, with new cementing material impervious to further attacks. This theory, introduced by A. Steopeo, a Rumanian expert, is open to some criticism; it gives, however, a better explanation of the chemical action of pozzuolanas than the other conception. Yet, we have to point out that the reaction of silica of the siliceous materials with calcium hydroxide proceeds very slowly. Therefore, it is unlikely that this slow chemical process may hinder the corrosive effect of aggressive solution on the calcium compounds released in the quick course of the hydration of cement. It is obvious that before the cement-pozzuolana reaction will be developed the greater part of the released calcium hydrate will be dissolved and washed out. Therefore, in this writer's opinion, the first and immediate action of pozzuolanas in improving the durability of cement concrete and mortar is of mechanical and physical nature. It is, of course possible, that in time, a chemical combination is taking place, producing matters which make the already stiffened structure still more impermeable and resistant to the attacks of aggressive waters.

Differing in opinion regarding the explanation of the action of pozzuolanas in cement mixes, the majority of the

(Continued on page 102)

[13] R. E. Davis. Journal American Concrete Institute (1934), pp. 381-382.

[14] A. Steopeo. Zement (1937), No. 11, pp. 169-172.

1939 in Review

Gypsum and Lime

NO figures are yet available on the output of lime in 1939, but it seems evident that there was a considerable increase over that of 1938 and possibly even over that of 1937, due largely to the rapid growth of private home construction. The high level of industrial production, including those industries using lime, helps to make the outlook for 1940 good.

No large new plants were built in 1939 but it is significant that some of the larger plants are being expanded. The new plants built were mostly small vertical-kiln operations. Expenditures in this field were devoted mainly to the improvement of existing plants.

Developments in the gypsum industry were again confined mainly to further expansion of the two large companies which dominate this field. Each of these companies built a new gypsum processing and products plant on the South Atlantic coast to meet the growing demand created by the rapid industrialization of this section. In the first nine months of 1939 the mine output of gypsum was up 20 per cent. over that of 1938, the production of calcined gypsum increased 27 per cent., and there was a sharp increase in the sales of gypsum lath.

The most important contribution of the National Gypsum Company was its new plant at Savannah, Georgia, which went into operation late in May, 1939. The products of this plant include a complete line of gypsum board, lath and sheeting, prepared and hard-wall plasters, cement rock, agricultural land plaster, etc. It has a capacity of 250,000 square feet of board and 350 tons of plaster in a 24-hour day and can load out a carload of cement rock every hour.

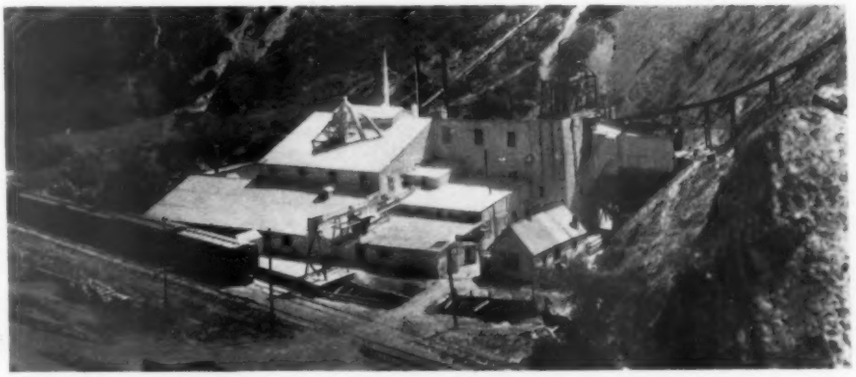
The plant is on the Savannah River and ocean-going vessels bring gypsum rock from Nova Scotia to the plant dock. A Robins unloading tower unloads the rock either into stock-piles at the dock or to a series of belt-conveyors feeding a Robins stacker which discharges to plant stock-piles. A Northwest crane re-handles the rock to either of two bins. One bin feeds a flow in which a Traylor roll-crusher and a Link-Belt vibrating screen separate out cement rock, which is loaded direct into cars. The fine material from this circuit joins the other flow through a blending bin, a Hardinge Ruggles-Coles 6- by 40-foot rotary drier, and a Williams hammer-mill to a Sturtevant 12-foot mechanical separator. Coarse material from this separator goes to a series of bins and feeders, then to a pair of Raymond 5-roll, low-side mills which are connected to Raymond cyclones and dust-collectors. The product of this system joins the fine rock from the separator and the combined materials go to a pair of Ehrsam 10-foot diameter calcining kettles. The calcined gypsum is conveyed to the board plant or to the plaster mill as desired. Fine rock from the separator can also go to the plaster mill.

There are several circuits for making gaging plaster, and white and dark stucco. Any of these circuits can feed an Allis-Chalmers 5-foot by 22-foot tube-mill. In the gaging-plaster flow two Munson 36-inch Buhr mills are used.

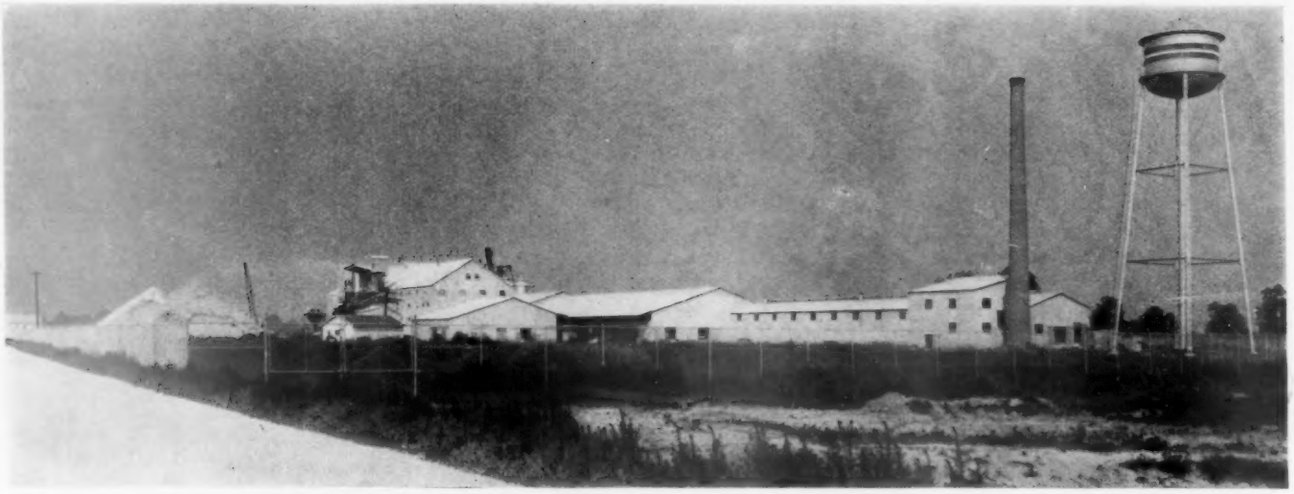
All these materials go to two 80-ton 2-compartment bins which feed the Broughton 1-ton mixers followed by packers. Agricultural land plaster is also made in this plant in a separate department.

The board plant is in a separate building and incorporates the latest in operating methods. Calcined gypsum is fed to bins with high- and low-level Bindicators, which automatically control the feed. These bins feed the soak belt-conveyor of the board machine. Paper pulp is prepared and is added on the soak belt with a foam solution. These ingredients are mixed on the belt and discharged on the paper, which is then creased and folded. The ribbon of board passes on a 197-foot flat rubber belt-conveyor followed by a second 197-foot belt. Both belts were supplied by the Boston Woven Hose & Rubber Company. Next the board travels over a 248-foot section of roller-

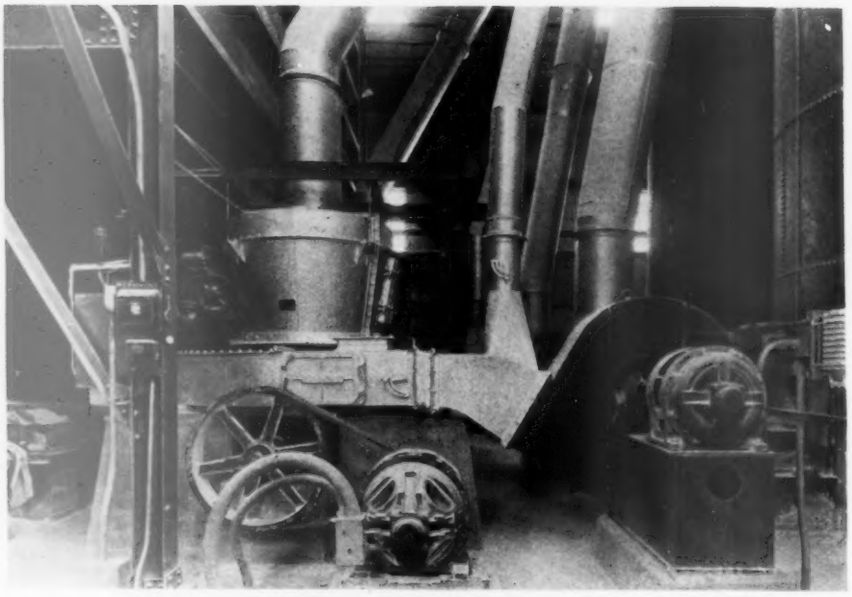
The rock-reclaiming tunnel and conveyor and the rotary lime kiln being installed by the Permanente Corporation.



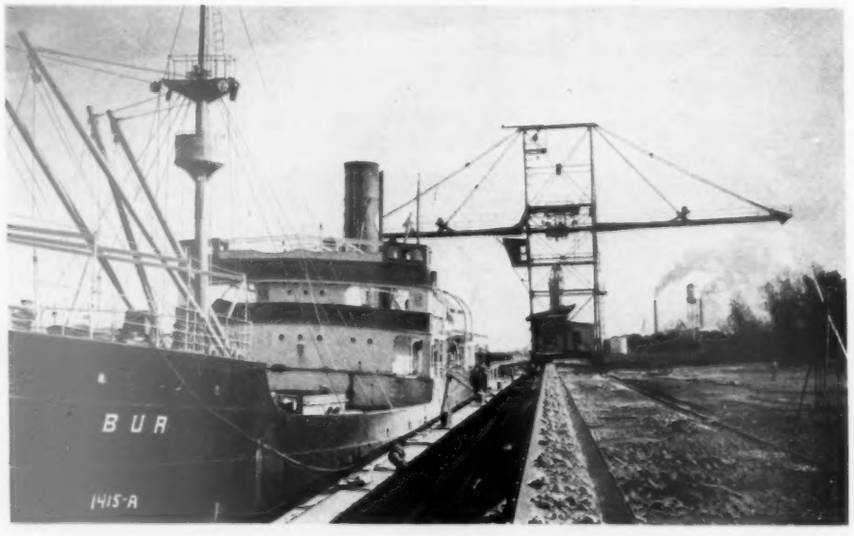
The plant of the Nephi Plaster Company at Nephi, Utah, which was taken over in 1939 by the United States Gypsum Company.



The new plant of the National Gypsum Company at Savannah, which manufactures a wide range of products.



The two 5-roll mills with motors and pipes to cyclones and dust-collectors in the National Gypsum Company's plant.



The unloading tower which unloads raw gypsum from boats to conveyor of stock-piling system at the Savannah plant.

conveyor. The boards or lath are cut automatically and transferred to the 230-foot 8-deck Coe drier which has thermostatic control and automatically regulates the heat in each of its three zones. The board machine and drier have capacities of 300,000 square feet in 24 hours. The warehouse has storage space for 1,500,000 square feet of lath or wall-board.

The United States Gypsum Company in February, 1939 put in operation a new and modern gypsum plant at Jacksonville, Florida, to supply the growing demand for gypsum products in the South. Since then the plant has been expanded five times to keep up with the demand. Even before the initial plant was in operation it was found necessary to add a department to manufacture Pyrobar gypsum partition tile. Six months later the capacity of this department had to be doubled. In March a second calcining kettle had to be installed and these combined improvements made it necessary to enlarge the rock-storage building. Within the past month work has been going forward on increasing the capacity of the gypsum-board department.

The rock-storage building is adjacent to docks on the St. Johns River and gypsum rock from the company's quarries in Nova Scotia is transferred direct to it from boats which also supply plants at Boston, New York and Philadelphia.

In 1939 also the United States Gypsum Company purchased the Nephi, Utah, plant formerly operated by the Nephi Plaster Company. This increased to 47 the number of mills and warehouses operated by this company in a nation-wide chain.

The Ebsary Gypsum Company, Wheatland, New York, installed a Raymond 4-roll, low-side kiln mill for simultaneously grinding and removing

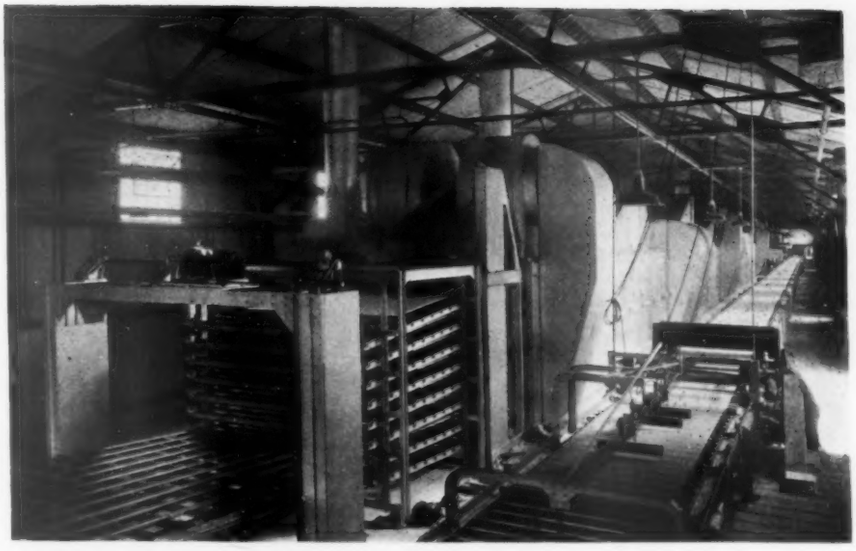
surface moisture from raw gypsum rock.

The Schumacher Wallboard Corporation, Los Angeles, California, improved its mine in Nevada, and has under construction a modern new processing plant in Los Angeles. A Raymond No. 50 Imp mill has been installed.

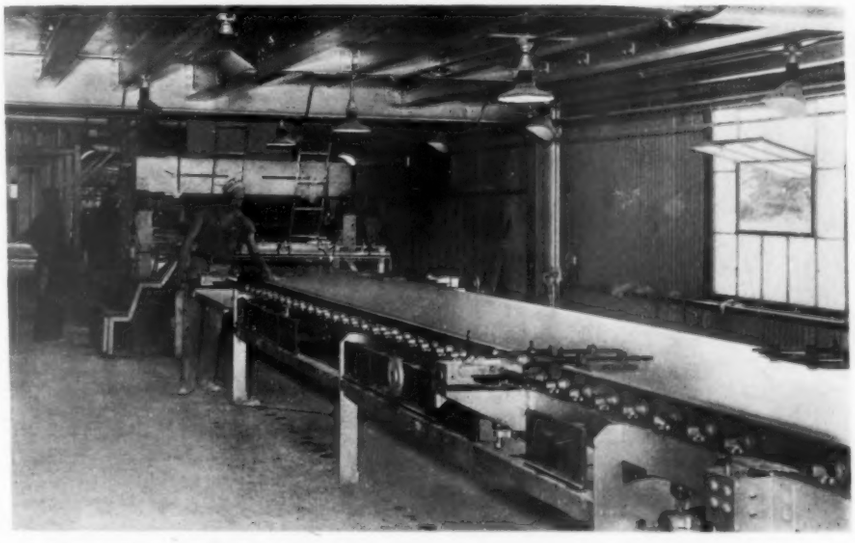
In connection with the new cement plant of the Permanente Corporation, a new lime plant, which will have a capacity of 100 tons of lump lime daily, is being built. The finished sugar rock, before being loaded for shipment, is passed over a Tyler Ty-Rock screen and the minus 2½-inch rock created by breakage is conveyed to a large stock-pile. A tunnel conveyor feeds this stone to another vibrating screen which produces dust (minus ⅛-inch), ⅛-inch to ½-inch chicken grit and ½-inch to 1½-incn kiln-feed stone. Oversize material is conveyed back to the crusher. Calcining is done in an 8-foot by 125-foot rotary kiln, which is followed by a 40-foot Hendy rotary cooler. A bucket-elevator feeds lump lime into two silos from which shipments are made.

Gypsum, Lime and Alabastine, Canada, Ltd., built a new vertical-kiln lime plant at Beachville, Ontario, replacing a plant which had become obsolete. As this company is one of the largest producers of lime on this continent, with six other plants in Canada, it was to be expected that this would be an efficient and economical plant. Each of the two vertical kilns produces 75 tons of lime daily with a fuel ratio of natural gas equivalent to a coal ratio of 6.3 to 1. Their combined capacity far exceeds that of the 10 vertical kilns in the old plant. The kiln is fired through a sectional center burner and 8 side burners. CO_2 gas can be recirculated when desired.

The plant of the Bluff City Lime & Stone Company at Mosher, near Ste. Genevieve, Missouri, was one of four large rotary-kiln lime plants built in 1937. Included in the equipment in this plant were 2 Allis-Chalmers 300-foot rotary kilns and shaking-grate coolers, Raymond direct-firing bowl mills, pulverizers, separators, dust-collectors, etc., a Kritzer continuous hydrator, Merrick Weightometers, Allis-Chalmers crushers, screens, feeders and motors, and Link-Belt conveyors and elevators. The company is now completing the installation of a third rotary kiln at this plant with a bowl mill and other necessary appurtenant equipment. Late in 1939 this company, a subsidiary of the Mississippi Lime & Cement Company, bought the Western Lime Works with a vertical kiln plant at Ste. Genevieve.



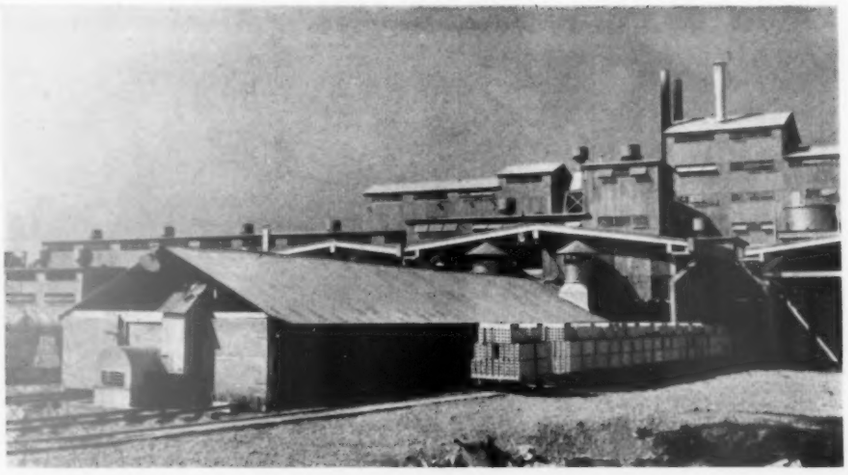
The feed end of the 230-foot plasterboard drier in the Savannah plant of the National Gypsum Company.



The ribbon of gypsum board leaving the forming rolls of the board machine in the National Gypsum Company's plant.

The single vertical kiln under construction at the new plant of the Bluewater Lime Corporation near Grants, New Mexico.

An aërial view from the dock end of the new plant of the United States Gypsum Company at Jacksonville, Florida.



Another view of the new Jacksonville plant of the United States Gypsum Company showing some of the gypsum tile made.

The new shovel loading waste and truck with detachable buckets for hand-picked kiln stone in the Dixie Lime Products Company's quarry.

The Frozen Carbonic Corporation, Neville Island, Pittsburgh, Pennsylvania, which in 1936 put into operation a plant using the Gillette system for the manufacture of CO_2 gas and lime, replaced the kiln or generator with an improved unit. The new generator consists of a vertical rectangular retor' with inside dimensions of 2½ inches by 36 inches flanked on the two sides by 18½-inch by 36-inch combustion chambers. This generator is producing daily from 3 to over 4 tons of CO_2 gas and from 4.75 to 6.5 tons of lime. The gas has a purity of 97 to 99 per cent. Dry ice is made from the gas. (*P&Q*, June, 1939, page 26.)

The Cutler-Magner Company, Duluth, Minnesota, installed a Raymond No. 372 bowl mill for direct firing a rotary lime kiln.

The Ohio Hydrate & Supply Company, Woodville, Ohio, installed a second Raymond No. 1 automatic pulverizer for the production of hydrated and finishing lime.

The Oyster Shell Products Company, Berwick, Louisiana, installed a

The two center-burner shaft kilns in the new plant of Gypsum, Lime & Alabastine, Canada, Ltd., at Beachville, Ontario.

Raymond 8-foot double-whizzer separator for classifying hydrated lime made from oyster shells.

The Bluewater Lime Corporation has near completion a new lime plant near Grants, New Mexico. This plant has a single vertical kiln and the Kuntz system of hydrating supplied by Lime & Hydrates Plants Company is used. The kiln has a capacity of 10 tons daily. Power will be generated by two 80-hp. Diesel-electric units.

The Thomasville Stone & Lime Company, Thomasville, Pennsylvania, and the New England Lime Company, Canaan, Connecticut, converted their

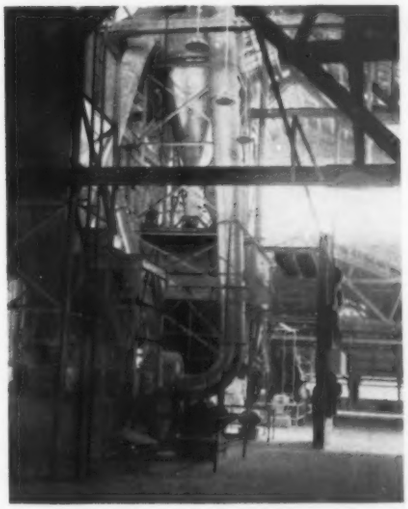
(Continued on page 102)

1939 in Review

Industrial Clays, Silica Sand and Other Minerals

IN addition to the industries separately reviewed elsewhere in this issue there are a number of others which merit separate treatment but lack of space unfortunately does not make this possible. For this reason also only enough of the many interesting and important developments are described to give some idea of the activity in these industries and the progress made in their methods of production.

Complete information is not yet available but it seems evident that most of these industries made substantial gains over 1938, keeping in line with the improvement in general business conditions. Some industries, notably fluospar, experienced a boom due to the European war and others for different reasons experienced a decline.



View inside the Sgoda Corporation plant showing the air-floating equipment.

One of the new plants which followed the first signs of revival of the fluorspar industry was that of the Colorado Fluorspar Corporation near Salida, Colorado. This plant went into operation September 1 and has a capacity of 100 tons daily. Both gravel fluxing spar and acid spar are being produced. Material is mined and discharged on a grizzly, oversize going to a 14-inch by 20-inch Austin-Western jaw crusher. An elevator feeds a bin from which a Denver feeder supplies a bucket-elevator. There are two flows from this point.

In the flow now being used only for making fluxing spar the material is passed through a drum washer followed by a trommel. Four of the 6 sizes produced go to 4 of 6 Ellis 4-cell jigs. The finest product of the trommel goes to a small rake followed by a trommel, which removes all the mud and extreme fines before feeding this material to the other two jigs. The products of the jigs go to a Morse Brothers drag-dewaterer and are then elevated to storage bins for truck loading.

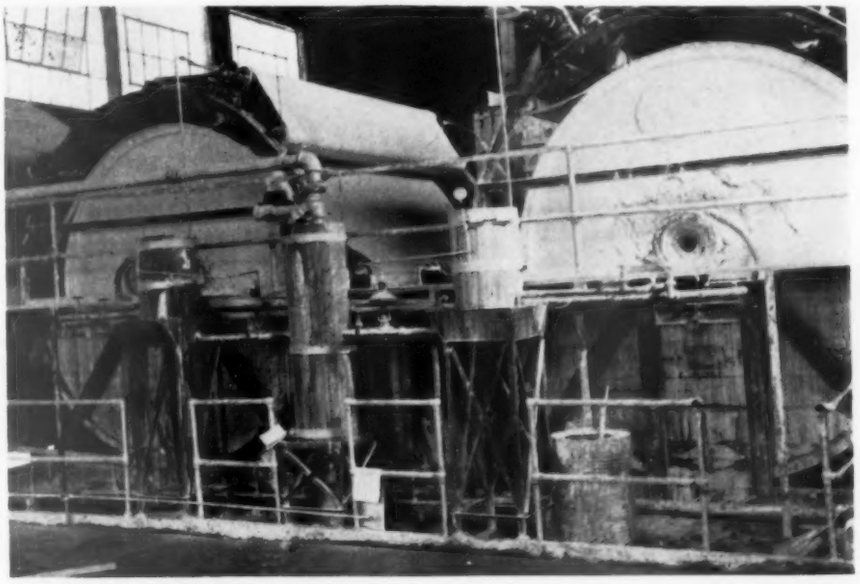
In the other flow the spar is fed to a Ball 5-foot by 6-foot open-end ball-mill along with the minus ¾-inch raw material and the jig flow. Dry reagents can be added by a Denver feeder. The mill product goes to a Morse Brothers rake classifier from which the oversize is returned to the ball-mill. The rake product is pumped by a 2-inch Wilfley pump to a Denver conditioner, reagents being added from 2 Denver feeders. The product then goes to 9 Denver No. 18 Sub-A flotation cells from which the concentrates are fed by an elevator to a 4-foot Denver revolving-drum filter. The filter cake goes to a 14-foot Denver rotary steam drier from which the acid spar goes into bins. (*P&Q*, December, 1939, page 48.)

The Mahoning Mining Company, Baxter Springs, Kansas, built a new lead-zinc-fluorspar mill at Rosiclare, Illinois. The products are lead concentrates, zinc concentrates and several grades of fluorspar concentrates. The plant is designed to handle between 200 and 250 tons of ore in 24 hours. The method of flotation is used 100 per cent. in the concentrating step. Most of the equipment for this plant was supplied by the Denver Equipment Company.

The Hillside Fluorspar Mines built a new 75-ton fluorspar plant at Rosiclare, Illinois.

The field of commercial clays was again busy during the year. Probably the outstanding new plant was the one erected at Huber, Georgia by the Sgoda Corporation, which has two plants in South Carolina. This new plant consists of two units, one dry and one wet. The dry unit differs from the conventional in that a steam drier is used in place of the usual coal-, oil- or gas-fired units. In the dry section crude clay is put through a crusher and is then elevated to a bin. A Hardinge disk feeder discharges the clay into the Louisville steam drier, from which it is conveyed to the feed bins of 2 Raymond 5-roller high-side mills. A Fuller-Kinyon pumping system is used to load the finished clay into cars for shipment. The entire system is closed and there is no possibility of contamination.

In the wet side the clay is first classified and is then fed to Filtration Engineers, Incorporated, Feinc continuous vacuum filters. Clay from these filters drops directly into an extruder which feeds a Proctor & Schwartz conveyor-



The continuous vacuum filters in the new plant of the Sgoda Corporation at Huber, Georgia.

The new silica-sand storage and drier buildings of the West Land Security Company at Tarbutton, Texas.

belt drier. A belt-conveyor carries the dried clay to storage bins from which it is loaded by conveyor into cars. This department is believed to be unique in the industry and, like the dry side, is an entirely closed and continuous system. In this plant all the drying is done by steam, eliminating any possibility of contamination. All the products are sold by J. M. Huber, Incorporated, of New York City.

The plant of the Georgia Kaolin Company, Dry Branch, Georgia, was destroyed by fire early in the year and has since been rebuilt. The new equipment installed included 2 Raymond 5-roll high-side kiln mills for simultaneously drying and grinding raw clay to high fineness.

A new kaolin plant was built by Cherokee Minerals, Incorporated, at Hollis, North Carolina. Mining is being done hydraulically and the equipment includes a series of beaters, washers and screens. The plant has a daily capacity of about 15 tons of kaolin, 5 tons of mica, and 50 tons of fine quartz sand.

The 3-cubic yard scraper at the Langworthy Silica Company's plant.

The Champion Paper & Fibre Company completed a new plant at Sandersville, Georgia, to process kaolin for use as paper coating. The equipment installed included a Raymond No. 50 Imp mill complete with a 6-foot cyclone, a 7-foot tubular dust-collector, and a 16-foot double-whizzer mechanical air-separator, along with a No. 1 automatic pulverizer.

Eastern Clay Products, Incorporated, installed a Raymond 5-roll high-side kiln mill in its plant at Pontotoc, Mississippi. This is used for simultaneously drying and grinding bentonitic clay.

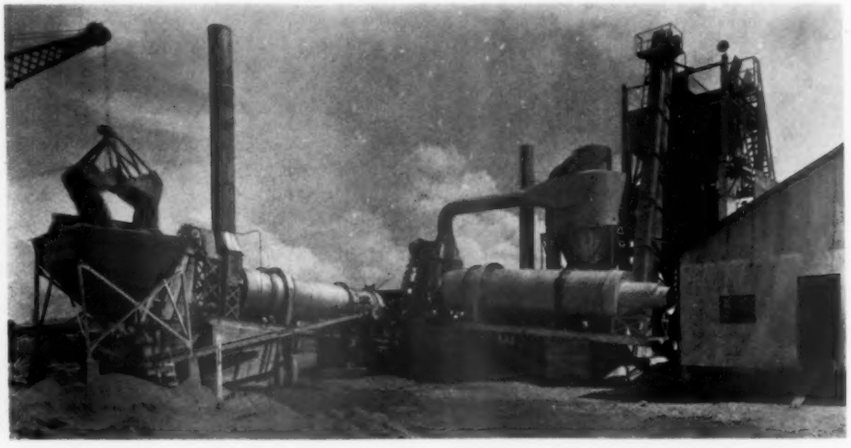
The roofing granules industry was particularly active in 1939. The Staso Milling Company, already one of the largest producers, led the field with two new and modern plants. One of these, at Bound Brook, New Jersey, was built at a cost of $350,000. It consists of 9 steel buildings with concrete foundations and corrugated-metal roofing and siding. This plant adjoins the property of the Bound Brook Crushed Stone Company, from which raw materials are obtained.

A new $260,000 plant is under construction at Marinette, Wisconsin, and it is reported that most of the output will be sold to the Flintkote Company.

The Funkhouser Company installed a Raymond 5-roll high-side mill with double whizzer separator in its Delta, Pennsylvania plant for grinding slate to medium and high finenesses.

The Minnesota Mining & Mfg. Company has a $1,500,000 program under way for the improvement and enlargement of its plant at St. Paul, Minnesota. Included is a new office building costing over $400,000. The company's roofing-granules plant at Wausau is also being enlarged.

The Barnsdall Tripoli Corporation, Seneca, Missouri, built a new all-steel



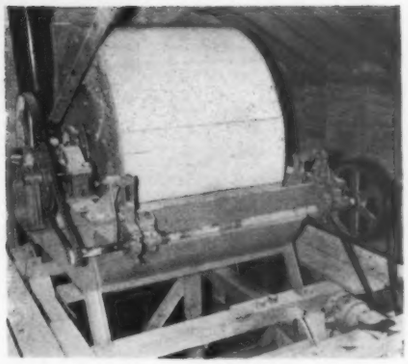
The new aggregate-bituminizing plant of the Roquemore Gravel & Slag Company at Montgomery, Alabama.

The plant in which the Black Hills Tin Company floats spodumene from quartz.

200-ton tripoli plant at a cost of $100,000. This replaces a wooden plant destroyed by fire in 1938.

The Independent Gravel Company installed a Raymond 6-foot double-whizzer mechanical air separator in its plant at Racine, Missouri, for the classification of tripoli.

One of the outstanding new aggregate-bituminizing plants of the year is that of the Pennac Asphalt Products Company, Johnstown, Pennsylvania, a subsidiary of the Quaker Sales Corpora-



The filter which reduces moisture in Colorado Fluorspar plant.

tion, which also operates several other crushed stone and asphalt plants. Briefly the equipment in this plant consists of a 40-foot Lancaster Iron Works rotary drier, a 3,000-pound batcher with a Kron scale, a Link-Belt vibrating screen, and an Iroquois 1½-ton mixer. Stone from a quarry 50 miles away and local slag are used as aggregates. Shipments are made by railway and trucks. One man controls the operation of this plant from his station on the batching floor. Grouped before him are the switches for all the electrical equipment, the levers for the bin and batcher gates, the bitumen thermometers and the meter and the scales.

The Roquemore Gravel & Slag Company, Montgomery, Alabama, early in 1939 put in operation one of the largest and most complete aggregate-bituminizing plants ever erected in the South. This plant was designed by the Iowa Manufacturing Company, which also supplied all the equipment.

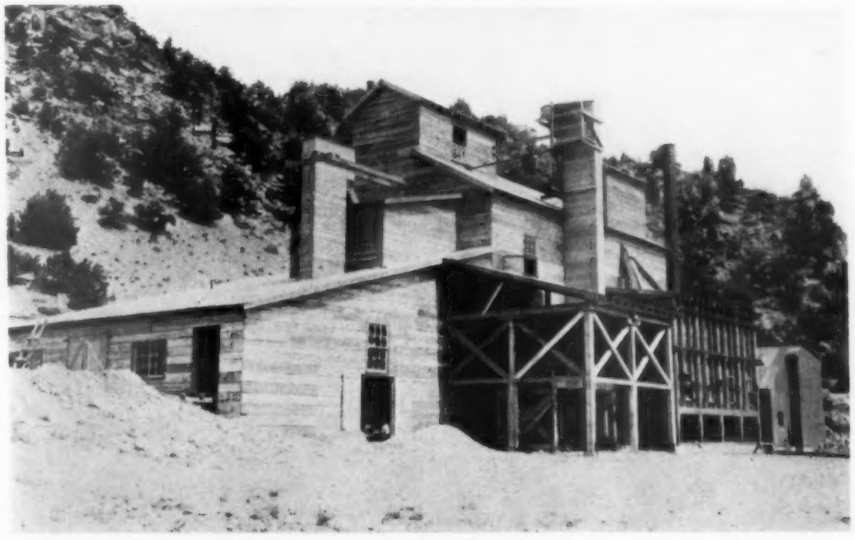
The Granite Rock Company rebuilt the hot mix asphalt plant at Aroma, California, which was partially destroyed by fire.

The Phosphate Mining Company, Nichols, Florida, installed a second Raymond bowl mill with gravity discharge and a 12-foot Raymond mechanical air-separator for closed-circuit work grinding pebble phosphate rock. This duplicates an installation made late in 1937.

The Federal Chemical Company, Nashville, Tennessee, installed a large Raymond 4-roll low-side mill for grinding Tennessee phosphate rock.

The West Land Security Company in 1937 built a silica-sand plant at Tarbutton, Texas, in which no detail was omitted in the effort to make a high-grade product. Included in the equipment were Deister Leahy screens, a Dorr turret-bowl classifier, a Dorr thickener and 10 Deister-Overstrom concentrating tables. The finished sand went to drainage bins in which the moisture content was reduced to about 8 per cent. A demand arose for an even drier product and early in 1939 equipment was installed for this purpose. Sand from these bins is fed to a 54-inch by 29-foot rotary drier which is fired with fuel oil. This reduces the moisture content to about ½ per cent. before it is discharged into a new storage building.

The Langworthy Silica Company remodeled its plant near Clayton, Iowa, to make possible year-around operation. The new equipment installed consists of a 5-foot by 40-foot Tyler oil-fired rotary drier and a 1½-cubic yard Sauerman Crescent scraper. The scraper stockpiles washed sand and also feeds it to the drier hopper. Formerly the washed sand was loaded into cars for shipment while still wet and operations had to be halted in freezing weather. The drier has a capacity of 12 tons per hour.



The new plant of the Colorado Fluorspar Corporation at Salida, Colorado, which produces 100 tons of fluxing and acid spar daily.

Part of the row of nine flotation cells preceding the filter in the Colorado Fluorspar Corporation's plant.

The Central Silica Company, Glass Rock, Ohio, installed two 20- by 60-foot Marietta concrete-stave silos for the storage of dry silica sand. Haydite staves were specified because of their thermal insulating qualities. The bins are equipped with tunnels at box-car floor level so that the box-car loader used can be readily moved from bin to bin.

The Pottsco Division of the Celotex Company built a plant at Gary, Indiana, to produce Pottsco lightweight aggregates from slag from the Carnegie-Illinois Steel Company.

The Waylite-Superock Company built a new light-weight slag aggregate plant at Bethlehem, Pennsylvania, which has a capacity of 8,000 tons per month.

The Carney Rock Wool Company, a subsidiary of the Carney Cement

Company, is building a new mineral-wool plant near Mankato, Minnesota. A fleet of trucks will deliver the product over a large territory. A single cupola and one 50-foot blowing cham-

The new rotary drier in the plant of the West Land Security Company.

ber are now in use, but space has been left for 2 more installations.

The Black Hills Tin Company with mines located at Tinton, South Dakota, has been successful in perfecting a flotation process whereby spodumene is cleanly floated away from the quartz with which it exists. There is a deposit on this company's property containing approximately 90,000 tons of spodumene quartz existing as minute crystals so closely interrelated that for many years the deposit was thought to be feldspar. Now, by virtue of a flotation process the spodumene can be separated and brought up to a lithium-oxide content of 6 per cent. or better. The deposit has been developed at 60-foot depth by the Fansteel Mining Corporation, a subsidiary of Fansteel Metallurgical Corporation of North Chicago, Illinois. This company operates the property for tantalum, which occurs in the spodumene quartz and it is naturally very much interested in the development of the spodumene ore body as it would make the task of obtaining tantalum easier. The Black Hills Tin Company conducted an experimental operation for six weeks during the summer of 1939 to establish that the process would work in production as well as in a laboratory. It expects to incorporate a spodumene circuit in its present tin-concentrating mill capable of producing several carloads per week.

The Barnsdall Tripoli Corporation installed a 6-foot double-whizzer mechanical air-separator at Grants, New Mexico, for classifying pumicite into various grades.

The Northwest Magnesite Company, Chewelah, Washington, installed a No. 312-A Raymond bowl mill for direct-firing a rotary magnesite kiln.

The Texas Carbonate Company, Florence, Texas, installed a No. 50 Raymond Imp kiln mill to be operated in conjunction with a 6-foot double-whizzer mechanical air-separator in drying, grinding and classifying chalk to various grades.

Ashkenazi (from page 94)

authorities agree that the properly constituted siliceous materials, when added to Portland cement, considerably improve the durability of cement concrete and mortar in corrosive solutions. It is, therefore, of importance to possess a simple and quick method for determining the "proper constitution" of the siliceous material in question. As has already been mentioned, the usually applied methods, the solubility tests determining the proportion of "active" silica, as well as the lime-pozzuolana tests, give some indications of the nature of admixtures, but do not estimate their actual value for the use in mixtures with cement. The present writer attempted to estimate the value of various siliceous materials by determining the coëfficient of absorption of calcium hydroxide and the grade of swelling. His experiments, however, remained unfinished, and the obtained results were of somewhat contradictory character. It must be admitted that, at present, we do not possess a general method for evaluation of pozzuolanic admixtures. Reliable, however, are the values obtained by the direct testing of the strength of mortar or concrete made of a particular pozzuolana and a particular cement and carried out under conditions similar to those which may be expected in the given case. Yet, when considering the results of these tests, it is to be taken into account that "while in the laboratory a hydraulic cement is readily decomposed, if intimately exposed to the chemical action of various sulphate and chloride solutions, field inspection indicates that in service these reactions are much retarded, if not entirely suspended, in most cases. Furthermore, although the testing of the strength of specimens is the most reliable method for the evaluation of siliceous admixtures, strengths do not represent the only criterion. It is well known that the inert, but finely-ground, minerals, when added to cement, have an important effect on the volume of the stiffening cement structure; they augment the amount of required mixing water, improve the workability, but increase the shrinkage of the cement paste. The pozzuolanic admixtures possess these properties in still more pronounced manner. When determining the value of pozzuolana these properties must be considered and in many cases they may be of greater importance than the established data of tests for tensile and compressive strength.

Lime-Gypsum (from page 98)

hydrating departments to the Kuntz system.

The Holmes Lime Company, Inc., moved its hydrating and processing equipment to a new plant in San Francisco, California.

The Dixie Lime Products Company made improvements which lowered the operating costs of its plant at Reddick, Florida. A Dempster Dumpster with three 2-cubic yard buckets was installed in the quarry to haul stone to the plant. Stone is discharged from the buckets into a car on an incline which feeds the vertical lime kilns. *(P & Q* September, 1939, page 25.)

The Valley Dolomite Company, St. Louis, Missouri, one of the pioneer producers of roasted dolomite, with plants at Granite City, Illinois, and Bonne Terre, Missouri, installed a new 150-foot Allis-Chalmers rotary kiln in the latter plant.

The plant of the Frozen Carbonic Corporation with the old and new lime-dry ice generators at right.

Annandale plant of the Pittsburgh Limestone Company. Screening building and stone-sand addition at left.

Pennsylvania Operator Adds Special Department to Produce Stone-Sand

By W. E. TRAUFFER

THE use of stone sand as a fine aggregate in concrete has been rapidly gaining in recent years. It is now included in the Federal standard specifications and those of the highway departments of many states, including New York, Ohio, Delaware and Pennsylvania and has also been used in several of the dams built by the Tennessee Valley Authority, Chesapeake and Ohio Railroad tunnels, and many large private projects.

The first paving project in Pennsylvania in which stone sand was used was built in 1937 on U. S. Route 30 in Wormleysburg Borough, Cumberland County, across the Susquehanna River from Harrisburg. The second project using this fine aggregate was on U. S. Route 422 just west of Butler, Pennsylvania, completed several months ago. This job included a total of 70,000 square yards of concrete pavement with 14,000 square yards of a bituminous-penetration center dividing lane in a distance of slightly less than 5 miles. The project included 20-, 30- and 42-foot width pavements, one large and one small bridge, and numerous culverts.

The Pittsburgh Limestone Corporation of Pittsburgh, Pennsylvania, a subsidiary of the United States Steel Corporation, furnished all the aggregates for this project from its Annandale limestone mine at Boyers, Butler County, Pennsylvania, about 18 miles north of Butler. The limestone sand used was produced in an addition to the plant which was completed in September, 1938. The feed is crushed limestone, minus ¼-inch, from which the plus 6-mesh and part of the minus 100-mesh are removed, with the intermediate 6- to 100-mesh being separated into three different sizes or fractions which are then blended into a controlled mixture to meet any specifications. A very uniform gradation results. Stone sand was also supplied from this plant for large sewage-disposal plants at Clarion, Emlenton, and Butler, Pennsylvania, and is being used on other important work.

The Annandale Mine was opened in 1912 and operations were conducted on a gradually increasing scale until the winter of 1931-32, when the plant was rebuilt and enlarged. Since then the plant has been further improved and ranks with the most efficient and modern operations in this industry. The plant now has a capacity of 900 tons per hour of various sizes of crushed limestone for blast-furnace flux, railroad ballast, concrete aggregate, general construction, and agricultural use, and produces 300 tons of stone sand in 8 hours.

The mine has been developed by the room and rib-pillar method, through drift entry on one level covering an area of nearly one square mile. Automatic-feed drifter-type air drills are used. Specially built electric shovels load the stone into cars, which are hauled distances up to 1½ miles to the crusher by electric locomotives. The important equipment used in the crushing-and-screening plant consists of a 36-inch gyratory primary crusher, a vibrating scalping screen, a 36-inch by 60-inch secondary roll-crusher, a 4-foot cone recrusher, and 15 vibrating sizing screens in three batteries of 5 screens each for dry screening, washing and de-watering.

Everything passing through the ¼-inch dry-screening decks goes to the stone-sand department. The water and stone particles passing through the washing and de-watering screens are flumed to a settling box and are then pumped to the sand plant as will be described later.

The minus ¼-inch material from the dry screens is discharged on an 18-inch by 36-foot cross belt-conveyor, from which it is discharged on an 18-inch by 26-foot inclined belt-conveyor. A 62-

foot fully-inclosed chain-bucket elevator feeds this material into a mixing box, which also receives the settlings pumped from the box mentioned in the preceding paragraph. A water jet mixes these materials, which are then flumed to a 6-foot by 18-foot rake classifier. This machine overflows minus 20-mesh material through a pipe into an 8-foot by 30-foot bowl-rake classifier. The plus 20-mesh material is raked over the end of the first classifier and drops through a split chute to a pair of 4-foot by 12-foot double-deck horizontal vibrating screens. These screens have 4-mesh cloth on their top decks and their bottom decks consist of three 4-foot sections, one with No. 5½ and the other two with No. 6 wire cloth. Material retained on both decks is discharged through chutes into bins and is not now being used in the sand, but can be so used when coarser sand is required.

The material passing through the bottom decks of these screens (6- to 20-mesh) goes to a 4-foot by 12-foot double-deck horizontal vibrating screen, which is equipped with 6-mesh cloth on its top deck and 8-mesh on its bottom deck when making state-specification concrete sand. These three screens are also equipped with washing sprays. Any of five or six other grades of sand, including masons' sand, can be made by changing the screen cloth. The material retained on the top deck of this screen drops into one hopper and that retained on the bottom deck goes to another. Electric vibrating feeders under these hoppers proportion and control the rate of feed of each of these sand fractions on a 14-inch by 28-inch belt-conveyor to the finished-sand storage bin. If desired, a controlled portion of the material in these hoppers can also be fed through chutes into the bowl-rake classifier along with the material passing through the bottom deck of the final screen. This classifier has an 8-foot by 30-foot rake and a 14-foot bowl. The excess of minus 100-mesh material overflows the bowl and is controlled between the limits of 3 and 6 per cent. specified by the state. A variable-speed drive of the bowl agitator and changing the diameter of the bowl, between 14 and 10 feet, make possible a wide range of control for any desired grade of sand. The rake section discharges the dewatered product into a hopper from which an electric vibrating feeder carries it with the two other sand fractions mentioned above to a revolving-disk mixer from which it drops into the 100-ton car-loading bin. A 70-ton car of sand is loaded in 10 minutes through two rubber-tube gates with levers controlled by ropes from the ground.

The settling box previously mentioned is 7 feet high, 6 feet wide and 9 feet long. A 4-inch centrifugal sand pump feeds settlings from the bottom of the tank to the rake classifier as has been described. Another 4-inch pump supplies clear water from the top of the tank to the spray nozzles of the screens.

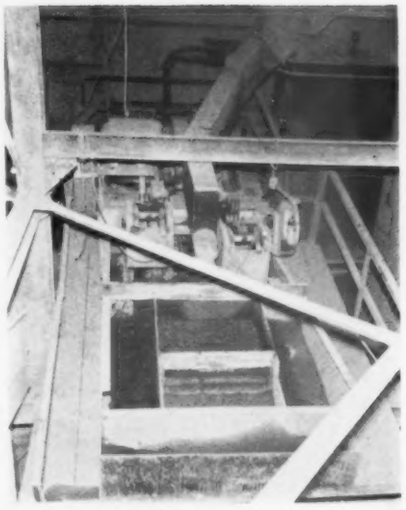
The specifications for the stone sand as a fine aggregate for the state-highway project at Butler were as follows:

"The fine aggregate may consist of stone sand of approved quality manufactured from approved rock meeting quality requirements for Type A stone as specified in Section 103 (a) and of such character that positive separation into individual grains will be effected when crushed. This stone sand shall be free from all deleterious substances and meet the requirements of the soundness test.

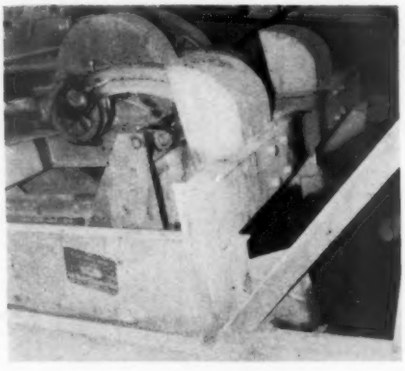
"All plants manufacturing stone sand shall meet the approval of the engineer and shall contain equipment designed to crush, wash and screen the stone sand to meet the mechanical analysis for grading within the limits designated and to vary the grading within those limits when directed by the engineer.

"The fine aggregate shall be graded

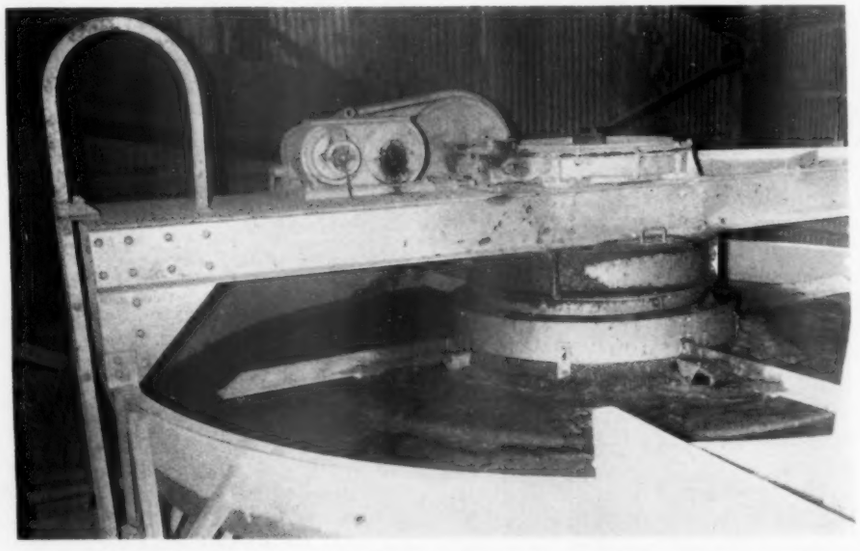
Vibrating screen which controls top size of sand.



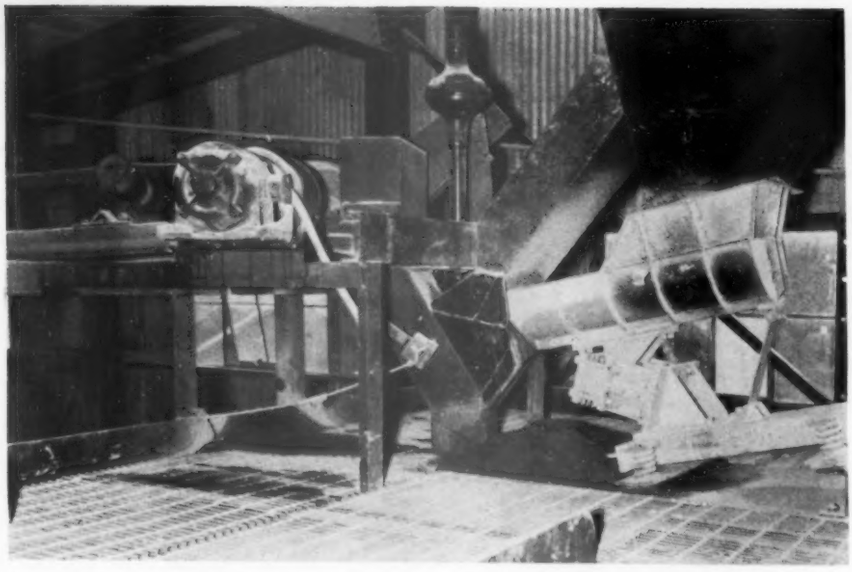
Rake classifier which splits material at 20-mesh for separate processing.



Rake of the bowl classifier discharging dewatered material.



The bowl of the classifier which is the final step in the manufacture of stone sand.



Vibrating feeder which discharges product of the bowl-rake classifier to mixing device in bin.

to meet the following mechanical analysis for Type A stone sand.

Sieve	Percentage
Passing No. 4 sieve	95 to 100
Passing No. 8 sieve	80 to 95
Passing No. 20 sieve	35 to 60
Passing No. 50 sieve	10 to 25
Passing No. 100 sieve	3 to 6

"The strength shall be not less than that specified for Type A sand.

"The maximum percentage of clay dust or other deleterious material removed by decantation shall not exceed 3 per centum by weight.

"When stone sand is specified the weight of the fine aggregate used in the proportioning for each bag of cement shall be determined by multiplying the specific gravity of the stone sand by 103, dividing by 2.65 and multiplying by 2, for concrete pavements, Type A concrete base and Class A concrete; and by 2½ for Type B concrete base and Class B concrete."

It is noted that the grading requirements on the stone sand calls for a product made within very close grading limits, especially the percentage passing the No. 50 sieve and the No. 100 sieve. The Pittsburgh Limestone Corporation product runs very uniform in these required percentages, and the amount of deleterious material is zero. This is due to the fact that there are no seams or strata of clay or foreign material in the limestone mined at the Annandale plant.

The Pennsylvania Department of Highways determined that the specific gravity of the stone sand was 2.72, therefore, the amount of fine aggregate required for each bag of cement in accordance with the last paragraph of the specification was 211 pounds for concrete pavements, for Type A concrete base and Class A concrete, and 264 pounds for Type B concrete base and Class B concrete.

One of the electric-vibrating screens in crushed-stone plant which control feed to sand department.

The 4-inch pump, left, recirculates water through screens. Pump at right feeds sludge to rake classifier.

The first concrete construction work on the Butler job was on one of the east piers for the fabricated structural steel bridge. Class B concrete, mixed 1:2.5:5, was used. The modulus of rupture on 5-day concrete averaged 465 pounds per square inch; at the end of 6 days if averaged 516 pounds.

The next concrete construction work was concrete pavement in the City of Butler between and on both sides of street-car tracks in which high-early-strength cement was used. The mix was 1:2:3½. Twenty-four-hour concrete showed a modulus of rupture of 566 pounds, the average taken on concrete poured on three successive days. When ordinary cement was used, the concrete after 5 days had a modulus of rupture of from 857.5 to 932.5 pounds. Five gallons of water was used per bag of cement on the concrete-pavement construction.

The contractor, the York Engineering & Construction Company of York, Pennsylvania, according to the company's sales manager, Alexander R. Chambers, reported that its finishers preferred the use of stone sand from Annandale on account of the easier workability of the concrete. It was quite regular for the hand finishers to have completed their work within an hour after the mixer had shut down. Through the use of stone sand, the concrete on this Butler highway showed high strength and density and is considerably lighter in color than the natural sand concrete, a feature especially noticeable on the structures.

The Pittsburgh Limestone Corporation has also furnished its stone sand to quite a number of contractors building P.W.A. projects requiring considerable form work and a large amount of reinforcing steel, and vibrated concrete. Time and form work was saved by the contractors due to the quicker setting of the stone-sand concrete, according to Mr. Chambers.

Tank Springs Leak at New Permanente Plant

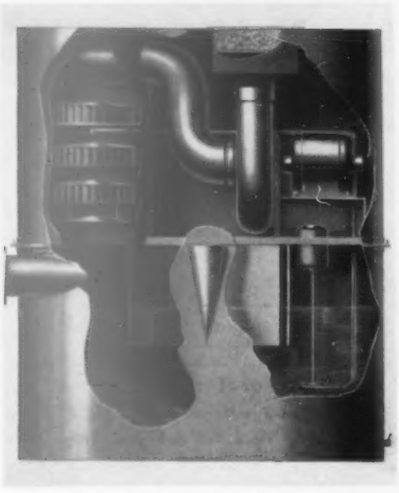
Several thousand dollars damage was done to the Permanente Cement Corporation's $4,000,000 plant under construction at Los Altos, California, recently as the result of a leak in a 1,500,000-gallon thickener tank.

The water gushed from a hole in the bottom of the tank, washed away considerable excavation work and reached the foundation of some of the partially-completed buildings. Several electrical motors and other equipment were seriously damaged.

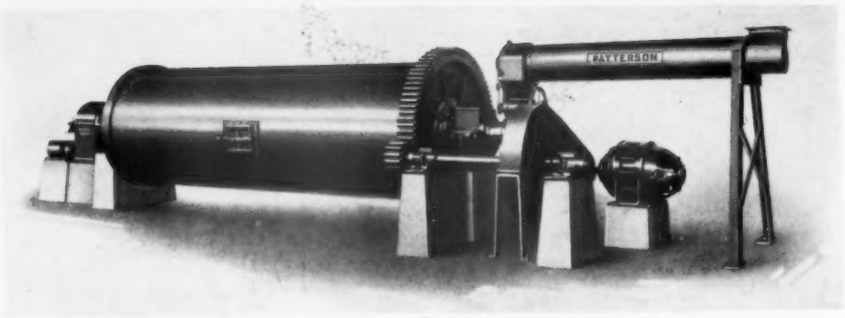
Harry Davis, engineer in charge of construction said some delay would result from the "dry-season" flood, but added he did not think damage would exceed $4,000.

NEW MACHINERY and SUPPLIES . . . 1939

The necessity for keeping operating costs down and efficiency up, new and more rigid specifications for finished products force the pit and quarry operator to keep his production equipment up to date and in first-class condition. New and improved machinery enables him to gain this advantage, to avoid obsolescence. On this and the succeeding pages Pit and Quarry presents pictorially a few of the many items of equipment brought out during '39.

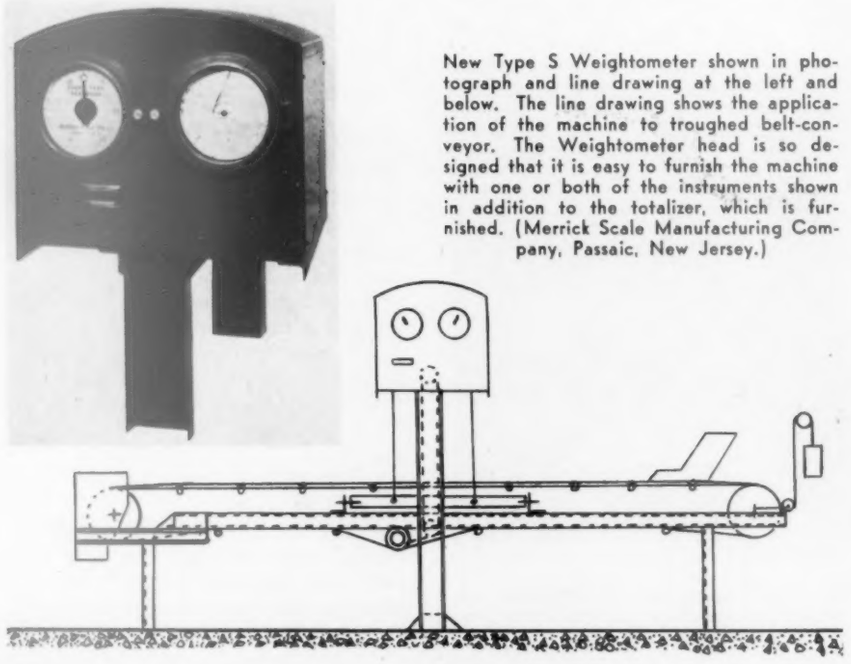


Portable type wet method dust-collector known as the "midget multi-wash collector." It is made in six small sizes with a range of from 300 to 1,500 c.f.m. and is a complete self-contained wet dust-recovery system. It is designed for the collection and disposition of dust and fumes arising from isolated operations or machines and equipments that can not economically be tied into a central dust-collecting system. The unit is self-contained and plugs into an electric outlet. (Claude B. Schneible Company, Chicago.)

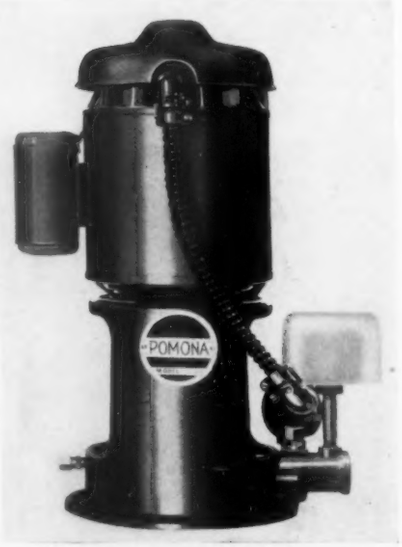


An improved method for the preparation of high-grade calcium carbonate by precipitation has been introduced in a lime-production plant and installation made of a tube-mill with pre-cooler to grind the product dry after it has been precipitated. This develops a finished product of fine particle size, free from agglomerates, of high refractive index and optimum particle shape. The lime is precipitated to sub-micron size, finer than it can be economically ground. It is then washed, run through a continuous drier and then, while still hot, fed to the tube-mill through the pre-cooler shown in above illustration. (Patterson Foundry & Machine Company, East Liverpool, Ohio.)

One of a series of heavy-duty cab-over-engine trucks having capacity ratings of 12,300 to 18,900 pounds. Available with wheelbases of 94, 106, and 124 inches and a special wheelbase of 142 inches. (International Harvester Company, Chicago.)

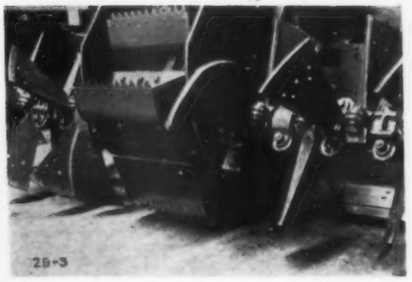


New Type S Weightometer shown in photograph and line drawing at the left and below. The line drawing shows the application of the machine to troughed belt-conveyor. The Weightometer head is so designed that it is easy to furnish the machine with one or both of the instruments shown in addition to the totalizer, which is furnished. (Merrick Scale Manufacturing Company, Passaic, New Jersey.)

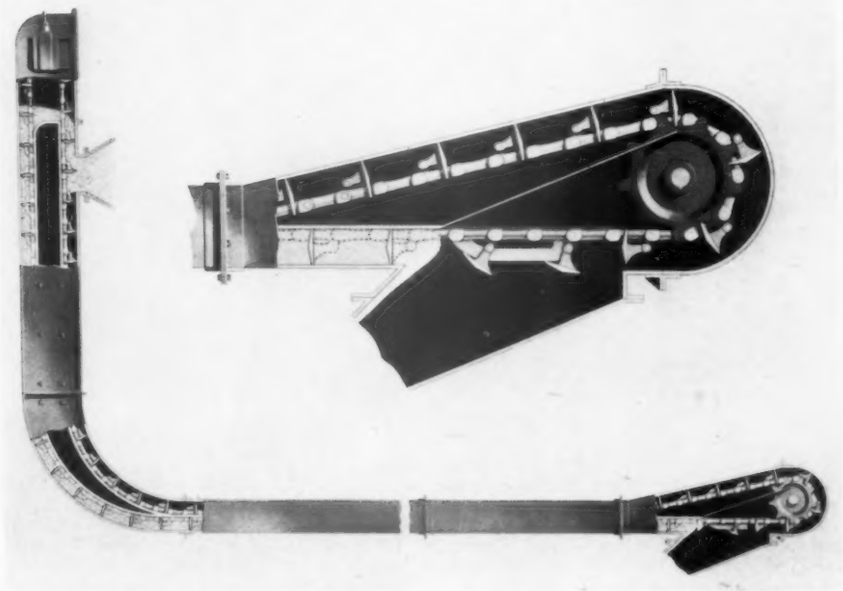


Employing the ejector principle of operation, the Pomona jet pump delivers water from a deep well against a domestic storage tank pressure, with no moving parts down in the well, in capacities from 180 to 1,200 gallons per hour with pressure up to 40 pounds. (Pomona Pump Company, Pomona, California.)

The growth in popularity of the detachable-bucket method of transporting raw material from quarry or pit is traced by the constant improvement in models offered by this pioneer in the field. The Model LF, one of the new and larger models recently introduced carries either drop-bottom, tilt-type or skip buckets. (Dempster Brothers, Inc., Knoxville, Tennessee.)

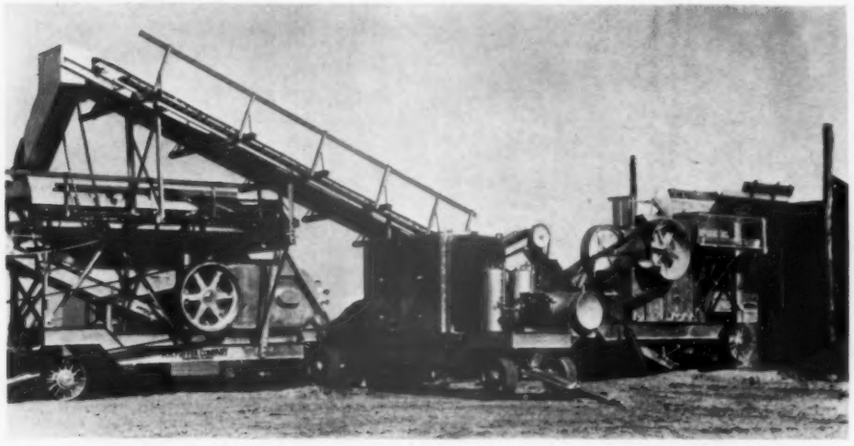


Cobble-guard plates and spiral master propellers adjacent to them which are furnished on the Haiss "bank special" loaders. Any cobble which is caught between the spiral propeller and the spiral cobble-guard plate will be squeezed out away from the elevator and away from the buckets as they go around the tail shaft thus preventing damage to the elevator and the buckets, putting the cobbles back into the bank. (George Haiss Manufacturing Company, Inc., New York.)

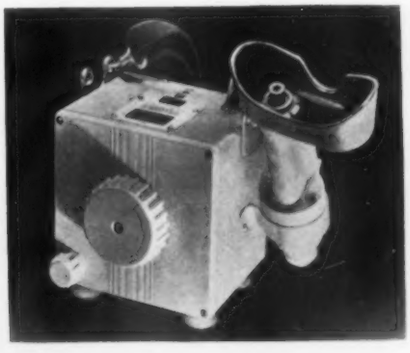


The Mass-Flo elevator-conveyor offers a low-cost and unique method of handling all kinds of granular materials and consists of a steel casing through which solid pivoted flights spaced at intervals on a single strand of chain, move the material horizontally or vertically in a solid mass or with partial load. (Jeffrey Manufacturing Company, Columbus, Ohio.)

Fluidometer system which does away with the conventional bucket-and-scales method of batching bituminous material into a road mixture. This machine is entirely automatic. The head is set for a predetermined amount of material. When the proper time comes this amount is sprayed into the pug-mill and after an interval of several seconds the head automatically resets itself and is ready for the next batch. This method is far more accurate than the weighing, is less dangerous and effects a considerable saving in time over the conventional operation. (Hetherington & Berner, Inc., Indianapolis.)



Installed for portable service by the Churchill Gravel Company of Pontiac, Illinois, these two units—one a jaw-crusher and feeder, the other a roll-crusher and screen unit—are producing approximately 100 tons per hour of agricultural stone and road aggregate. Power is supplied both units economically by a Cummins KP-601 Diesel engine mounted on a separate steel truck for portability. (Iowa Manufacturing Company, Cedar Rapids.)



An entirely new temperature-measuring instrument—the L&N optical pyrometer is now a potentiometer. To measure the temperature of hot, glowing objects, the operator has only to sight the telescope and adjust the potentiometer knobs. Calibrated, not in milliamperes, but directly in degrees, it measures temperature conveniently and with high accuracy. (Leeds & Northrup Company, Philadelphia.)

The Marquette Cement Manufacturing Company uses this two-way side-dump trailer unit for hauling stone out of one of its quarries. Each body has a water-level capacity of 12 cubic yards. This special unit is equipped with end-mounted, side-dump hoists. Equipment of this type is becoming increasingly popular and numerous installations were made during 1939, usually displacing locomotives and cars. (Gar Wood Industries, Inc., Hoist & Body Division Detroit.)

One of six units supplied last year by this maker to the Tennessee Valley Authority for quarry service in southern Kentucky. A Waukesha engine drives the unit through an eight-speed transmission. The body has a water-level capacity of 10 cubic yards. (The Hug Company, Highland, Illinois.)

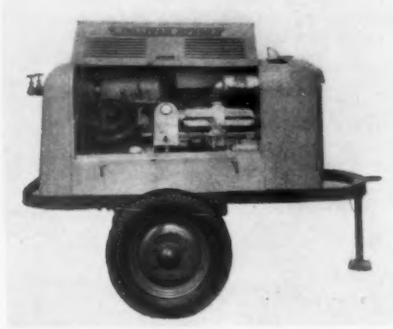
Sterling six-wheel four-wheel chain-drive HCS models have been placed in many types of quarry service. The four rear wheels are driven by means of one unit located between the two rear axles. Massive gears, shafts, and bearings are encased in the drive unit which also houses three differentials. Since fewer differential gears are used, all gears are more sturdy in construction and maintenance is seldom required. (Sterling Motors Corporation, Milwaukee, Wisconsin.)

This 250-watt inclosed portable floodlight, for temporary or emergency illumination, is easily handled with its weight of only 20 pounds. It is equipped with a galvanized steel trunnion bracket with a 12-inch circular base, 10 feet of rubber-jacketed cord with plug, and a carrying handle. A polished aluminum reflector is inserted in a cast aluminum housing. (General Electric Company, Schenectady, New York.)

Designed strictly for emergencies, this patented electric light uses a new battery similar to the standard type of lantern battery. The main difference is that the cells are packed and sealed in a dry state and activated only by striking the bottom of the battery against any solid object. No deterioration can possibly take place because, until the battery is struck, the cells do not become energized. (Triumph Explosives, Inc., Elkton, Maryland.)

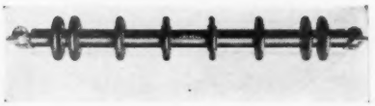
Light-weight vibratory riddle, weighing but 39 pounds, operating from any light socket at a cost of one-tenth of a cent per hour at average rates. The machine known as the "Univibe," can be held in the hands, operated on a small stand which is adjustable to the desired operating angle, or it may be aërially suspended by means of studs provided for that purpose. (Universal Vibrating Screen Company, Racine, Wisconsin.)

A ⅜ cubic yard convertible truck shovel with four-wheel drive for extra traction on rough ground. The addition of a front-wheel drive axle adds to the maneuverability of this unit without decreasing mobility on the highway. The modern constant-velocity joint on front axle also greatly increases the ease of steering. Air clutches handle shovel and boom mechanism. Optional gasoline or Diesel power is available. (Michigan Power Shovel Company, Benton Harbor.)

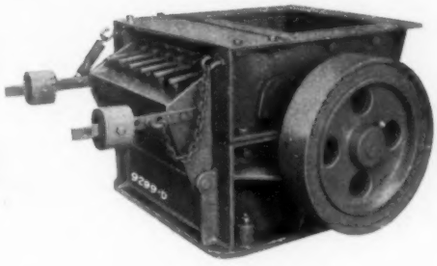


The Zeph-Air, a new streamlined portable compressor is available in two sizes with air deliveries of 60 and 85 cubic feet per minute for pressures up to 125 p.s.i. Electric starters are standard equipment. (Sullivan Machinery Company, Michigan City, Indiana.)

Available with gasoline, Diesel or electric power, and convertible for use as shovel, drag-line, clam-shell or crane, this 2-cubic yard excavator, designated the 44-B, has a number of interesting features. These include a high-speed crowd and the synchronization of crowd, hoist and swing. The dipper is of special design. Assures fast, clean dumping action. (Bucyrus-Erie Company, South Milwaukee.)



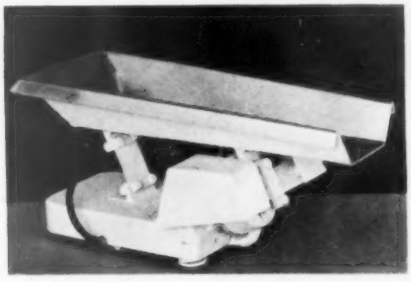
Conveyor-belt idler composed of rubber disks variably spaced on a steel-tube shaft. Designed especially for use with abrasive, corrosive or sticky materials. Rubber-to-rubber contact keeps belt wear at the minimum. (Robins Conveying Belt Company, New York.)



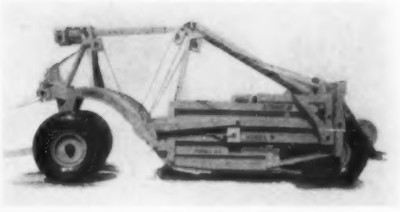
Ring-type crusher featuring manganese-steel sectors which operate so as to crack large pieces rather than crush them. This cracking action is said to materially reduce the percentage of fines. (Stephens-Adamson Manufacturing Company, Aurora, Illinois.)

Piano-wire, with the wires running in one direction only, applied to a vibrating screen is said to pass undersized particles much more rapidly than conventional types of screen cloth. Made in meshes from ⅜-inch to 12-mesh, it can be furnished in stainless steel if desired. (Jeffrey Manufacturing Company, Columbus, Ohio.)

The length of the stroke or pump capacity may be varied in the diaphragm pump shown above without stopping the pump itself. It is ideally adapted for handling overflow from thickeners and can hand'e pulps running 60 per cent. or more solids. (Hardinge Company, Inc., York, Pennsylvania.)



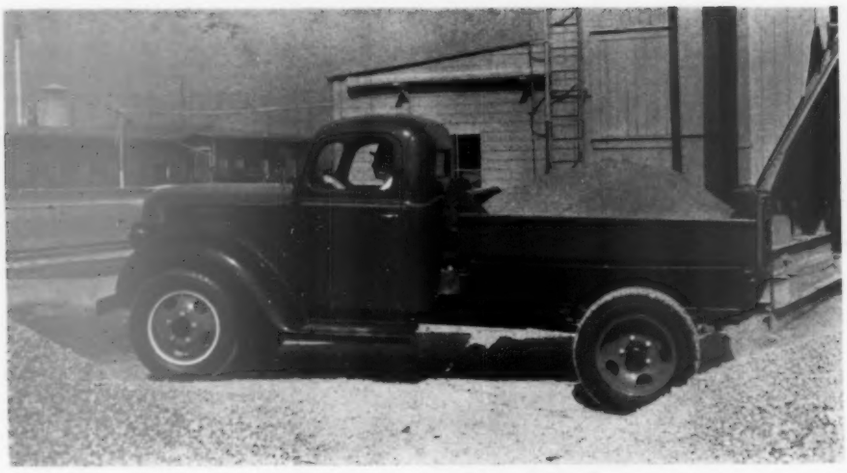
Small model vibrating feeder for controlling the flow of bulk solids. Equipped with a sensitive, finger-tip control. (Syntron Company, Homer City, Pennsylvania.)



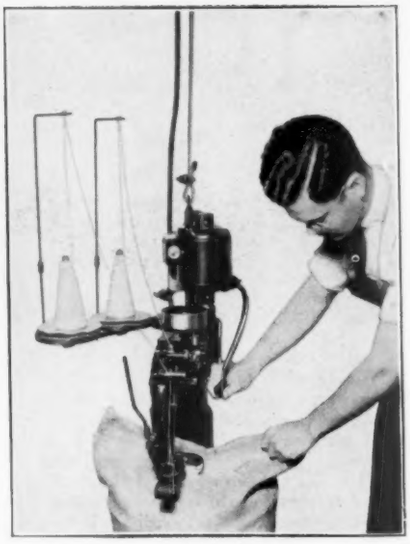
Single-bucket, Model P Carryall scraper of 11-cubic yard, struck measure, capacity. Extra high sides on the scraper bowl retain the extra yardage that often is wasted over the sides with big loads. A new curved yoke strengthens the entire assembly, eliminating stress points. (R. G. Le Tourneau, Inc., Peoria, Illinois.)

All high-speed shafts in this combination excavator are mounted in anti-friction bearings. The machine, designated as Type 60, is available with a 20-foot boom, 1-cubic yard dipper and a 100-horsepower gasoline engine with Diesel power optional. Boom and handle are of the welded, box-girder type. (Osgood Company, Marion, Ohio.)

Dual crushing plant in which the belt-conveyor return system for feeding back material from the crushers has been replaced by a turbine-type revolving elevator. Requiring only one operator, the plant is of welded construction and is mounted on 12 low-pressure tires to meet highway regulations. (Universal Crusher Company, Cedar Rapids, Iowa.)



Forty important improvements designed for greater economy feature the 1940 line of Ford V-8 trucks and commercial cars. There are 42 body types, 6 wheelbases and engines of 60, 85 and 95 horsepower. Hydraulic brakes are used on all units. Rear-wheel equipment accommodates tire sizes up to 8.25 by 20 inches. "Under-the-hood" accessibility has also been increased.



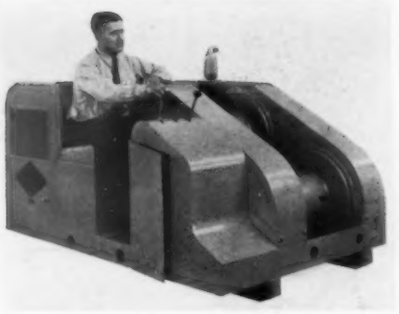
A new suspended-head type bag-closing machine designed specifically for packing rooms where production is small and operations seasonal or part-time. The sewing head is driven by a 1/4-horsepower motor and the machine is suitable for closing any size or type of fabric or paper-lined fabric bag. (Union Special Machine Company, Chicago.)

An improved model "load lugger" featured by correct load distribution and simple control of the hoisting mechanism which may be mounted on any standard truck chassis. Buckets are one-piece units made of heavy steel plate and reinforced. They have a capacity of 2 cubic yards struck measure each and a height of but 27 inches for easy loading. (Brooks Equipment & Manufacturing Company, Knoxville, Tennessee.)

A new feature in clam-shell bucket design aims to reduce maintenance problems resulting from the practice of "dropping the bucket". A practical solution to this problem is the new type of lever-arm bucket recently developed. This improved form of construction not only provides for a direct transmittal of stress and shock between head pin and corner pins, but also insures a rigidity which maintains permanently true alignment between the upper sheaves and lower sheaves—thus obtaining a condition conducive to long cable life. (Blaw-Knox Company, Pittsburgh.)

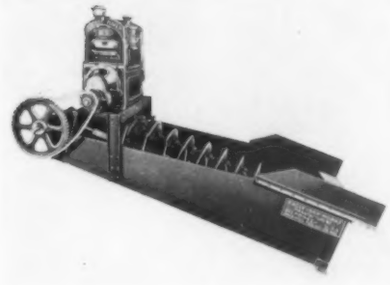
One of the latest contributions to speedy and efficient material handling is this walking dragline equipped with a 5-cubic yard bucket and 100-foot boom. Available with buckets of from 3- to 12-cubic yard capacity and booms from 80 to 200 feet. (Marion Steam Shovel Company, Marion, Ohio.)

Although of unusually light-weight construction, this ¾-cubic yard excavator is said to have an abundance of speed and power for heavy-duty performance. Has direct drive from engine to countershaft. The turntable is mounted on four drop-forged, heat-treated conical rollers. (Universal Power Shovel Company, Milwaukee.)

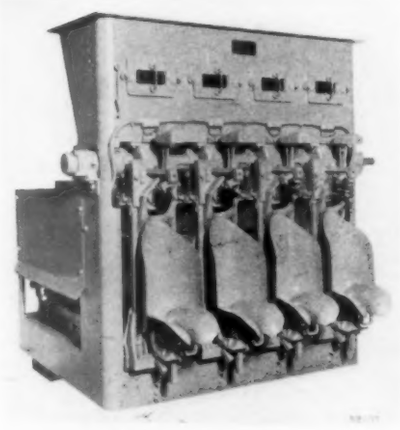


Designated as a "safety hoist," this 37-horsepower two-drum machine has all moving parts inclosed by a steel housing to prevent accidents and to keep the cable from becoming entangled in the gears. Other features: ball-bearing, cam-operated brakes; steel gears with machine-cut teeth; chain drive running in a bath of oil; and a one-piece steel frame. (Clyde Iron Works, Duluth.)

This new truck tire is said to assure long, trouble-free service. Spun-rayon cords and a new and deeper tread with greater road contact combine to make it perfectly balanced and cooler running under gruelling service. (Goodyear Tire & Rubber Company, Akron.)



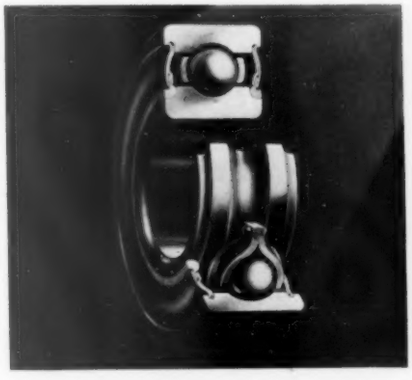
A Hercules 4-cylinder Diesel power unit furnishes the power to operate this double-screw sand-and-gravel washer. The washer consists of two spiral screws each 12 feet long. Water swirls upward through the material, entering through inlets arranged between the screws. (Eagle Iron Works, Des Moines.)



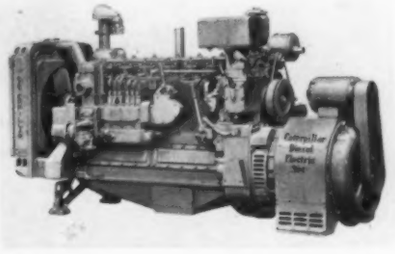
A new 4-spout automatic weighing and packing machine now made available to American industry after a long period of successful use in Europe. An ingenious system controls all dust and assures a clean package. (Modern Valve-Bag Company, Allentown, Pennsylvania.)

All-steel reduction crusher which works on the gyratory principle but operates at higher speeds than formerly were employed. Especially designed to turn out a cubically-shaped product with high output. New-type dust seals keep working parts clean and reduce wear. (Allis-Chalmers Manufacturing Company, Milwaukee.)

This Orsatomat, or automatic flue-gas analyzer, measures the absorption of CO_2 automatically through an ingenious use of mercury. The mercury traps the gas sample into the absorption chamber where the CO_2 is instantly absorbed, causing the sample to shrink, create a vacuum and actuate the indicator. (Hays Corporation, Michigan City, Indiana.)

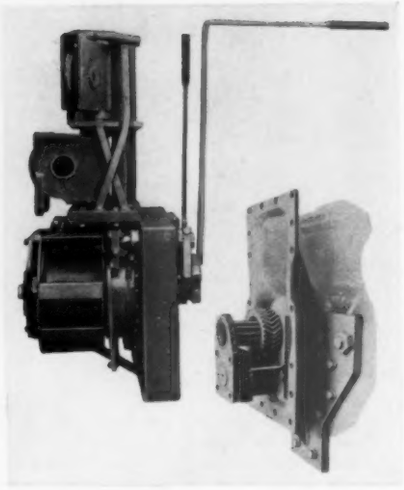


A 1939 development was a line of sealed ball-bearings, a cut-away view of one assembly being shown above. The modern "air-cleaner" type of seal is employed rather than the old stuffing-box method. (SKF Industries, Inc., Philadelphia.)

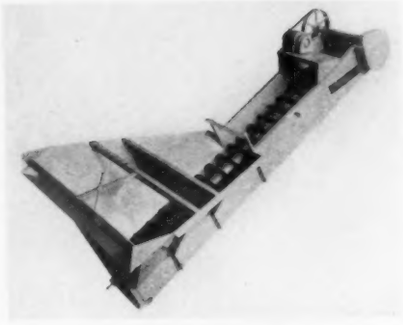


This Diesel-electric set of 30 kilowatts capacity has all electrical equipment built in with the exception of the circuit breaker. The engine has but three operating adjustments, none of which involves the Diesel fuel system. Can be installed and ready to operate within one hour's time. (Caterpillar Tractor Company, Peoria, Illinois.)

Material-handling machine of radically new design especially adapted to moving bagged materials about the plant or for loading into cars. The system of pi ing the materials on skids or pallets lowers costs and utilizes all available space. (Clark Equipment Company, Battle Creek, Michigan.)



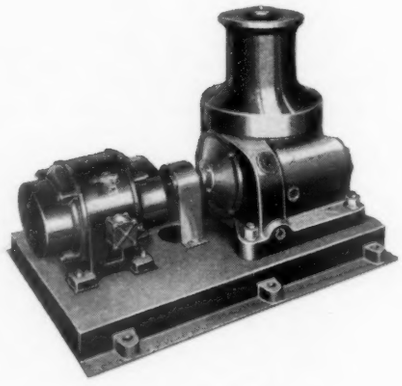
Better control of power and greater job adaptability, all obtained at low cost, are made available through this Model T power-control unit. The interchangeable neck and gear-casing make it possible to have one gear-case for any size tractor. (R. G. Le Tourneau, Incorporated, Peoria, Illinois.)



Screw-type classifier for dewatering, rewashing, and classifying closely graded sand. The screw is of special abrasion-resisting steel. (Smith Engineering Works, Milwaukee.)

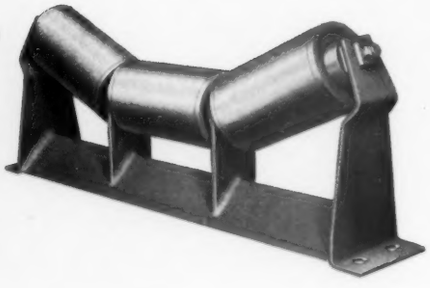
One model of the new line of two-stage air-cooled portable compressors introduced by this company. Availab'e in five sizes for actual capacities of 85 to 315 cubic feet of air per minute at 100 pounds pressure. (Ingersoll-Rand Company, New York, New York.)

Semi-automatic high-production jack-bit grinder, a one-man machine capable of increasing production to 60 hard bits or 100 annealed bits per hour. Aging is done automatically. (Ingersoll-Rand Company, New York, New York.)



Vertical capstan car-puller with electric-motor drive. A ratchet and pawl may be supplied when required, mounted inside the capstan, for holding cars on an incline when the power is off. (Link-Belt Company, Chicago.)

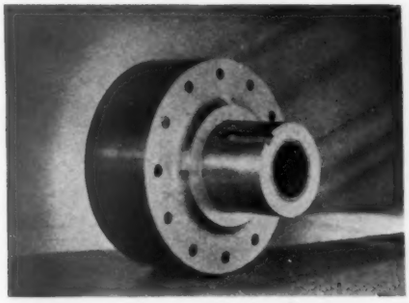
Small motor-generator type arc-welder said to provide greater convenience because of a new self-indicating dual continuous-current control. For stationary or portable use. (Lincoln Electric Company, Cleveland.)



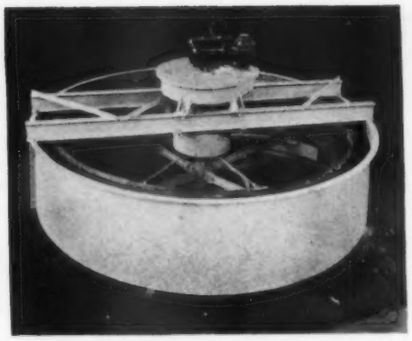
Improved troughing idler which has a self-cleaning base. Of all-welded construction it has replaceable rolls and simplified lubrication. Uprights are welded to the base and the ends are of pressed steel. (Pioneer Engineering Works, Minneapolis.)

With the addition of the 4-cubic yard tower excavator pictured above, this manufacturer now has a full-range of such equipment capable of handling buckets from 2 to 10 cubic yards capacity. (Sauerman Brothers, Inc., Chicago.)

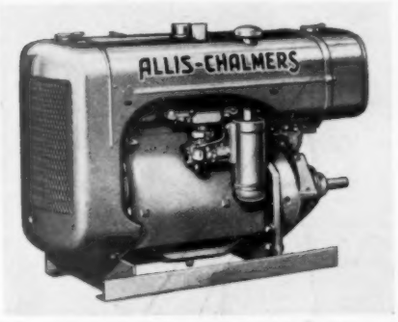
The Lorain 79, a newly-designed 1½-cubic yard convertible excavator. Mounted on chain-drive crawlers with two travel speeds in either direction. All-steel, all-welded dipper stick. (Thew Shovel Company, Lorain, Ohio.)



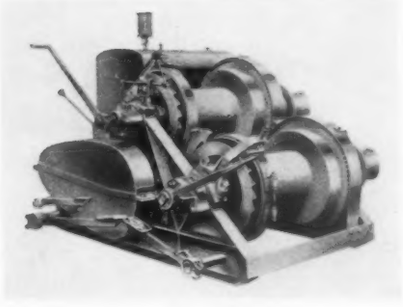
"Over-running" clutch consisting of a forged-steel housing, rigidly connected to a sleeve. Designed to operate on the principle recognized for years as the best for free-wheeling action. (Hilliard Corporation, Elmira, New York.)



Improved hydro-classifier, the design of which provides two outstanding advantages: improved performance and low operating cost. Designed for metallurgical, chemical and industrial purposes, the entire unit is compact and efficient. Multi-speed motor is used in order that the scraping may be varied in speed to meet existing requirements and to provide repulping in case it should be desired. (Hardinge Company, Inc., York, Pennsylvania.)



Industrial gasoline engine unit, which has removable cylinder liners. Develops a maximum of 19 brake horsepower. (Allis-Chalmers Manufacturing Company, Milwaukee.)



All-purpose gasoline hoist that has three speeds instantly available on both drums. Powered by an 85-horsepower gasoline engine. Variation of speeds and loads obtained through clutch and gear shift. (Clyde Iron Works, Inc., Duluth.)

Impact crusher for secondary reduction, incorporating a new type of crushing action. Built in four sizes from 25 to 250 tons per hour. (Nordberg Manufacturing Company, Milwaukee.)

Industrial locomotive powered with either the 85- or 95-horsepower Ford V-8 engine. The present line includes models ranging from 2½ to 8 tons in size and in any gage. The builder has been engaged in constructing locomotives with Ford engines since the days of the Model T. Ford engines converted to Diesel operation may be had if desired. (Brookville Locomotive Company, Brookville, Pennsylvania.)

Type 331 excavator of ¾-cubic yard capacity. Features include: tubular, all-welded steel boom; cone-type rotating clutches; chain crowd; and positive swing-shaft lock. (Marion Steam Shovel Company, Marion, Ohio.)

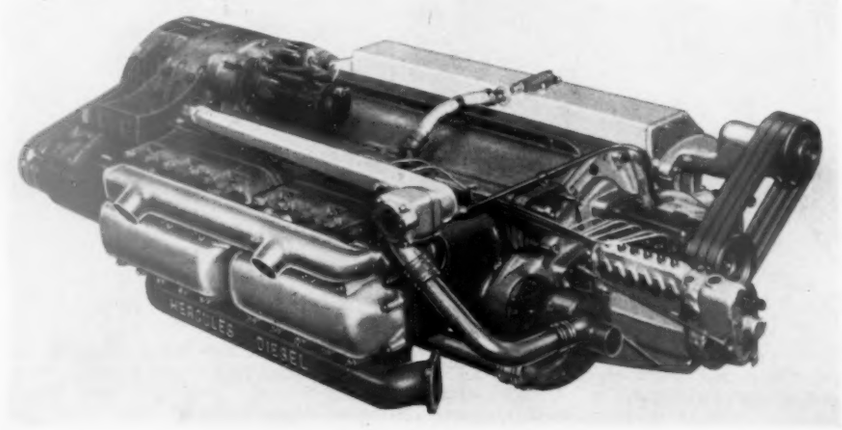
Traction on the ½-cubic yard mobile truck-shovel shown above has been increased by the addition of a dual tandem-drive system. Built for quick conversion from shovel to crane, dragline, or clam-shell operation. Gasoline or Diesel power optional. (Michigan Power Shovel Company, Benton Harbor, Michigan.

A ¾-cubic yard streamlined gasoline or Diesel-powered shovel, with chain or cable crowd optional, called the Byers 1940 Model 83. Main frames and shovel booms are of oxyograph torch-cut, die-formed and electrically-welded rolled-steel plate. Ball and roller bearings carry all major shafts and friction-clutch disks. Drive from the 72-horsepower 6-cylinder engine is through silent chain, inclosed and running in oil. (Byers Machine Company, Ravenna, Ohio.)

Latest addition to the Cooper-Bessemer line of vertical Diesel engines is the Type JS. Separate cylinder liners of the wet type are fitted with oil-proof grommets at their upper and lower ends to seal the water joints. The crankshaft is a one-piece steel forging. Die-forged steel connecting rods are used, having two-piece crankpin boxes and fitted with fully-removable precision bearings with shim adjustment. The piston pin ends of the connecting rods are bolted solid to the piston pins to provide greater bearing surface. Piston pin bearings are two-piece solid-bronze shells, which afford a practically full length bearing. (Cooper-Bessemer Corporation, Mt. Vernon, Ohio.)

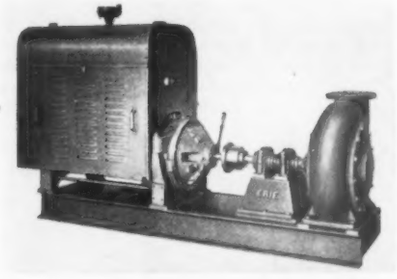
Each year as the Ford Motor Company makes chassis and body refinements and improvements, Marmon-Herrington engineers keep pace in making the necessary changes to apply traction and power to all the wheels. This re-engineering to adapt the Marmon-Herrington conversion to 1940 Ford models has been completed. These new trucks offer increased stamina, strength and safety as well as more effective power utilization. In addition, the heavy-duty series of Marmon-Herrington All-Wheel-Drive trucks and trailer tractors offer more than thirty models of four-wheel and six-wheel units. These units range in size up to 25-ton load capacity for trucks and up to 50 tons or more for tractors. (Marmon-Herrington Company, Indianapolis.)

Vibrating screen equipped with Hendrick high-carbon steel plates, heat-treated after perforating. These plates are made from ¾-inch steel with 4-inch square openings. The screens to date have been in service 2,900 hours and 1,200,000 tons of stone have passed over and through these screen plates. (Hendrick Manufacturing Company, Carbondale, Pennsylvania.)



LEFT—These Diesel DXF engines of horizontal or "pancake" design were developed primarily for applications wherein limited space requires engines of minimum height. In designing the engine special care was taken to assure proper lubrication. The oil capacity is exceptionally large, due to the use of an oil tank built directly into the oil pan. A water pump of abundant delivery assures proper cooling of oil in the engine parts and a carefully planned water circulating system eliminates any tendency toward hot spots. The cylinders are of cast iron with removable dry-type sleeves made from special alloy. Available in 176 to 193 horsepower. (Hercules Motors Corporation, Canton, Ohio.)

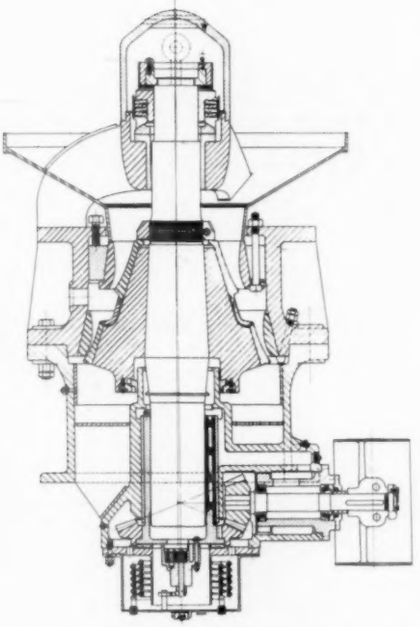
Important improvements in classification have been incorporated in the new Hardinge hydro-classifier. The driving head embodies a geared-head motor. Sand, or oversize, in the classifier is delivered through a central opening, in the bottom of the tank, which is surrounded by a whirling vortex of water which assure proper desliming of settled solids, and a clean oversize.—(Hardinge Company, York, Pennsylvania.)



This 6-inch dredge pump is direct-connected on a steel sub-base to a Continental 75 horsepower self-contained power unit complete as shown, ready for operation. It is equipped with Timken roller bearings and is suitable for operating against total heads up to and including 75 feet. The pump can also be used against heads up to and including 100 feet when driven by a larger motor. Self-contained power units like the one illustrated can also be furnished for 4-, 6- and 8-inch pumps.—(Erie Pump & Engine Works, Medina, New York.)

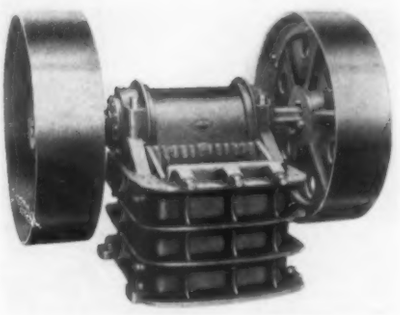
The above 20-ton locomotive is of the Diesel-hydraulic type, a new development of this old, established builder of all kinds and types of locomotives. This new unit has a number of important advantages, chief of which are said to be smoothness and ease of operation. There is no mechanical connection between the engine and the drivers, all power being transmitted through the fluid drive. Early in 1939 the company established a process-equipment division for the design and construction of ball- and pebble-mills, tube-mills, agitators, mixing equipment, blenders, tanks, and other equipment for the process industries.—(H. K. Porter Company, Inc., Pittsburgh.)

A pneumatic-tired bucket-loader built for fast highway towing and available in two different models. Built as a standard machine with the usual high-bucket loader boom and swivel spout, also as a low-clearance machine with a short boom and swivel conveyor. The high-boom, swivel-conveyor loader can be used for all typical bucket-loader applications, including loading sand, gravel, and crushed stone from stock-piles to trucks. The low-clearance model (with swivel conveyor) has the same advantages of portability plus low clearance, plus a swivel conveyor discharge.—(Barber-Greene Company, Aurora, Illinois.)



The Traylor-Stearns multi-stage fine reduction crusher sketched above is said to produce an extremely cubical product at a high rate of output. The upper stage functions as a feeder for the lower stage, at the same time accomplishing about 50 per cent. of the crushing. The feed is said to be maintained exactly right for the lower stage to operate at maximum efficiency, easy adjustment of the discharge opening of the upper stage making this possible. Mantles and concaves are of manganese steel.—(Traylor Engineering & Manufacturing Company, Allentown, Pennsylvania.)

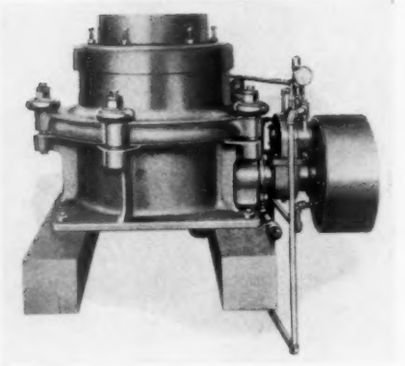
A newly-designed line of crawler shovels, 1½ to 2 cubic yards capacity, Series 300, equipped with Speed-o-Matic hydraulic (oil) power control and Diesel, gasoline, oil or electric-motor drive. Particular attention is called to the fact that the new line is being announced only after over a year of field tests as a shovel, drag-line and crane on tough digging and handling jobs.—(Link-Belt Speeder Corporation, Chicago.)



A new 10- by 24-inch jaw-crusher said to have great capacity at low power cost, with uniform product-size control. Built with oversize heavy-duty roller bearings in pitman and journal boxes, with extra-heavy forged-alloy steel heat-treated eccentric shaft. Extra long pitman allows the use of long manganese jaw plates with graduated contour that gives positive breaker grip and rapid passage of reduced product. The ribbing and contour of these jaw plates are designed to crush to desired size with minimum undersize and oversize materials.—(Diamond Iron Works, Minneapolis.)

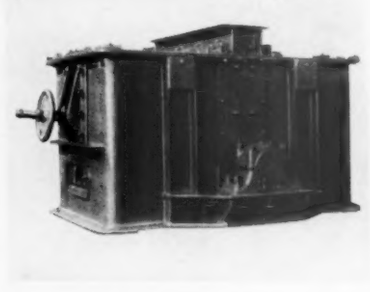
A new Thor drifter rock drill, known as the 100B, designed for heavy-duty drifting in mining and large tunnel work. Used with 1¼- and 1½-inch round lugged steels, its power and strong rotation give it remarkable drilling speed in the hardest formations. In addition, a constant blowing action keeps the hole clean and for final hole cleaning a manually-operated valve is easily accessible for extra blowing power. One outstanding feature of the 100B drifter is common to all Thor drills. This is the positive, short-travel valve which controls the air admitted to the tool and allows just the amount of air to enter that is required to operate it most efficiently. Automatic lubrication protects against wear.—(Independent Pneumatic Tool Company, Chicago.)

A sturdy tractor, and a rugged trailer for level quarry operations, powered with the model EG Mack tractor. This tractor has a smaller engine than would be used for a similar road unit since high power and speed are not needed for the average quarry. However, it has been built to withstand the rough going and hard knocks by the use of oversize axles, springs, and tires. The trailer unit is manufactured by the Easton Car & Construction Co. Body is Phoenix type, side dump, of 9½-cubic yard capacity. A practicable transferring hinge arrangement and outriggers on the trailer are aids to the side dumping. Tending to stabilize the job when unloading, the ends of the outriggers contact the apron over which the load spills at discharge, relieving the springs of abnormal stresse:. (Mack Trucks, Inc., Long Island City.)



Crusher for secondary and fine crushing, said to produce ½- to ¾-inch rock at a decidedly lower cost per ton. The Telsmith Intercone, as it is known, is a high-speed machine with a conical head which gyrates horizontally within an outwardly flaring curved concave bowl. Material crushed in the upper zone automatically spreads over a greater area as it moves downward, between crushing strokes, through the lower crushing zone to the discharge opening. Lead-bronze eccentric sleeves, manganese-steel wearing surfaces, force-feed lubrication, positive protection against tramp iron, simple, fast adjustment, together with quick and easy replacement of wearing parts, exceptionally low headroom requirements, and a simple drive are distinguishing features. (Smith Engineering Works, Milwaukee.)

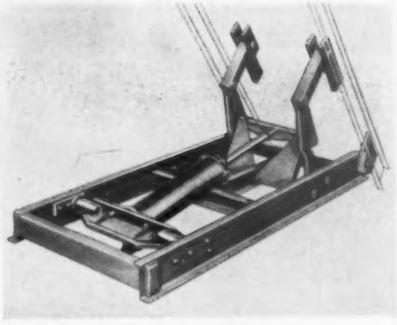
The new Pioneer 2036 jaw crusher can be furnished with new style jaw plates that are designed to eliminate slab-shaped rocks in the crusher product. This "slabbing" problem was solved by designing an entirely new style of jaw plates for use in primary crushers. This new plate has a wavy shape rather than a corrugated shape. The waves are spaced 6 inches from peak to peak, and the peak of one jaw fits into the valley of the opposite jaw. The effect of this shape of jaw plate on the crushing operation is to subject the slab-type rock to a true breaking strain, rather than to a squeezing pressure. (Pioneer Engineering Works, Minneapolis.)



The Pennsylvania Reversible Impactor reduces abrasive material by impact, without attrition, producing a high percentage of cubical particles of the desired size with the minimum of extreme fines. Originally developed for making artificial sand and aggregate, tests have proved the Impactor to be peculiarly adapted to a wide variety of refractory and other abrasive impact reductions, sometimes making two-stage crushing unnecessary. Of simple readily accessible design, and of heavy steel construction, Impactors are now available in six sizes, in capacities from 10 to 400 tons hourly. Smaller and larger sizes will be furnished as requirements develop. Bulletin 6000 gives details. (Pennsylvania Crusher Company, Phi'adelphia.)

The Stearns organization has made extensive improvements in the design of its circular and rectangular magnets whereby heat from the coil is dissipated rapidly by being conducted to the outside of the head casting where fins or ribs which cover the entire area afford an increased cooling surface. By raising the center ribs there is provided extra protection to the cable terminal and it eliminates extra cover plates, gaskets and cap screws. Another important, new feature is the simplified assembly. Special bolts clamp the coil and shoe units to the outer shell with many tons of pressure. The familiar "Stearns" magnetic pulley has been improved to provide greater factors of safety, increased depth of field and deeper, stronger power for assuring maximum efficient service at peak loads. (Stearns Magnetic Manufacturing Company, Milwaukee.)

LEFT—One of the outstanding power developments of last year was the new supercharged, 125-horsepower Cummins Diesel, Model AAS-600. The supercharged engines, including also a 200-horsepower model, weigh only 10 pounds per horsepower, including the weight of standard equipment, such as the fuel pump, electric starters, etc. The supercharging unit itself is only a small compressor or blower which creates a pressure behind the air entering through the intake manifold. The supercharged Diesel has approximately 7 to 8 pounds of air pressure in each cylinder at the start of the compression stroke whereas unsupercharged high-speed engines, gasoline or Diesel, are likely to have a negative pressure or a slight vacuum. The blower or supercharging unit itself is attached to the manifold side of the engine and is belt-driven through a slip clutch from the front end. (Cummins Engine Company, Columbus, Indiana.)



UPPER LEFT—New truck-body hoist of the double-arm-type lift. It is a fast, powerful, low-pressure hoist with the lift point well forward and centralized under the load. During the entire dumping operation the arms lift vertically to the bottom of the body. (Anthony Company, Inc., Streator, Illinois.)

ABOVE—New model tractor-drawn dump trailer of 18 cubic yards capacity. The dumping doors of this 200-horsepower unit are air-powered and air-operated, controlled by a valve from the steering wheel. (Euclid Road Machinery Company, Cleveland.)

ABOVE—New line of Type 30 excavators, consisting of 1/2, 5/8 and 3/4-cubic yard machines, all fully convertible with any standard attachments. (General Excavator Company, Marion, Ohio.)

RIGHT—Self-feeding agricultural-limestone spreader. Heavily-built and long lasting, one man driving the truck can control the entire operation. Ideal for quarries who can sell material and spread it at low cost for farm buyers. (Flink Implement Service, Streator, Illinois.)

Lightweight Aggregates Employed Centuries Ago

Historical studies of the use of lightweight aggregates for concrete by the Bureau of Mines reveal that the naturally occurring lightweight aggregate—pumice—was used purposely to decrease dead weight of certain types of construction in Roman times during the first century B.C. and the first to the third centuries A.D. Roman architecture, in addition to other noted features, was responsible for the introduction and wide employment of concrete. Roman concrete comprised a cement mixture of lime and pozzuolanic material and an aggregate of local stone usually obtained close to the building site. However, for the construction of such great domes as that of the Pantheon or for the construction of the immense vaults of many public baths, pumice was used as the coarse aggregate of the concrete. According to J. H. Middleton (*The Remains of Ancient Rome,* vol. II, p. 173, 1892) the top of the vaulting apparently was filled in level with the crown, so that the suspended mass of concrete was enormously thick in places. Hence, the lighter weight obtained by the use of pumice probably was welcomed by the architects of that time, because ancient Roman vaults were so constructed that they had no lateral thrust but rested as dead weight on the supporting walls.

It might be argued that the large fragments of pumice from 3 to 6 inches across were not used as an aggregate because the material appears to have been laid or pressed into the concrete mixture. However, the evidence is to the contrary, as the process plainly consisted of pouring a layer of the larger-sized stones by hand and then pouring a second layer of the concrete over the stones. This resulted in a cast monolithic structure more properly termed concrete than rubble masonry, regardless of the regularity of occurrence of the coarse aggregate. Moreover, the mixture of pozzuolanic cement and fine aggregate constituted the main bulk of the set concrete.

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Personal Mention

THOMAS J. O'ROURKE, formerly vice-president in charge of sales of the Pierce-Arrow Motor Car Corporation, has become associated with the Buffalo Gravel Corporation, it was announced by Charles F. Strasmer, Jr., president.

T. T. LEONARD of Silverton, Oregon, is the new owner of the Oregon Lime Products Company, whose plant and quarry are located at Falls City. Mr. Leonard purchased the business from Hawkins & Roberts. ROY BAKER, who has been managing the operation, continues in that capacity.

DR. L. T. BROWNMILLER of the Alpha Portland Cement Company addressed the LaFayette College Society of Chemical Engineers at Easton, Pennsylvania, recently on the topic: "Chemical Engineering in the Cement Industry."

F. H. CUNNINGHAM has started producing sand and gravel from the bed of the Colorado River in the vicinity of Wharton, Texas.

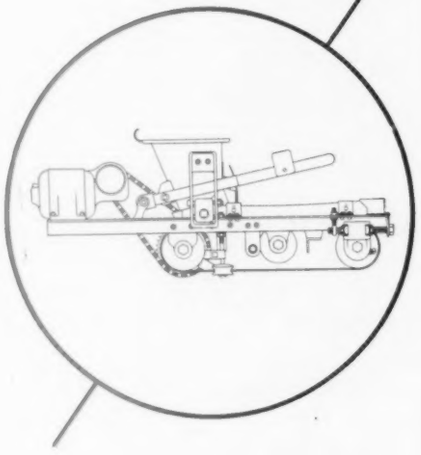
WILLIAM STIER has sold his cement-products plant at Richmond, Michigan, to his nephew, VINCENT L. FITZGERALD.

RALPH M. HOFFMAN, vice-president and sales manager of Link-Belt Company's Pacific division, San Francisco, for the last eight years, has been appointed assistant to the president of the parent organization, Link-Belt Company, with headquarters at the company's general office in Chicago.

EDWARD M. SANSOM, formerly attached to the New York office of the Electric Storage Battery Company, has been appointed district sales manager for the Whitcomb Locomotive Company at New York. B. L. BECK, formerly with the Fate-Root-Heath Company, has been appointed district sales manager for Whitcomb at St. Louis.

DON W. SMITH, who was with Sterling Machinery Corporation during 1935 and 1936 and resigned in 1936 to become district sales manager for the Osgood Company, has again joined the sales department of Sterling Machinery Corporation.

HARDINGE says



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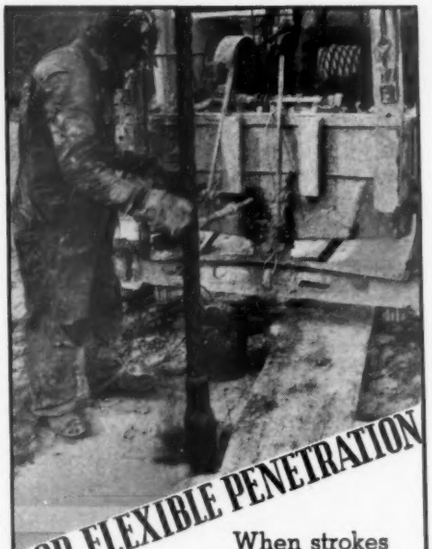

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•
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. . . the strength that comes from simple design, amply heavy structural members, a factor of safety in every part that will withstand a *stalling* overload. Big engines, heavy locomotive-type transmission, manganese chains and sprockets. LOW UPKEEP throughout.

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GEORGE GOVRO is installing a rock-crushing plant near Yachats, Oregon, and the Salem Sand & Gravel Company is reported to have purchased a half interest in the plant.

JACK W. HUSSEY has been appointed manager of gypsum sales of the Celotex Corporation, Chicago. Mr. Hussey brings to his new position fourteen years of successful merchandising experience in the building-materials industry. In addition to this broad background he was a technical service manager for the Universal Atlas Cement Company for eight years, then owned and operated the Jack W. Hussey Construction Company of St. Louis, for four years.

P. J. AKMADZICH of Los Angeles has been granted a permit to maintain a crushed-rock plant in the San Fernando Valley.

NEAL A. BALDRIDGE has acquired the Radom, Illinois, quarry formerly operated by the Material Service Company of Chicago.

EARLE O. HUDSON and RALPH BRUST have purchased the Marysville Sand & Gravel Company plant and pit located at Milford Center, Ohio.

WILLIAM CHRISTIAN has sold his sand-and-gravel business at Coquille, Oregon, to ELMER E. BENHAM.

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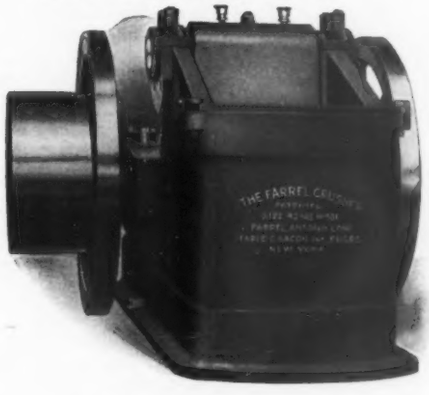
Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants. Engineering Service



EARLE C. BACON, Inc.

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OBITUARIES

EDMUND SHAW, 69, well known in the industry as a writer and inventor of the Shaw classifier, died December 13 at Los Angeles where he had resided for a number of years. Death was caused by a heart ailment. Mr. Shaw is best remembered for his editorial work with *Rock Products* magazine. Besides a son and daughter living in California, he is survived by two sons in Chicago and another in El Paso.

JOSEPH H. WALTON, mechanical engineer of the Southwestern Portland Cement Company's plant at Victorville, California, died at San Bernardino recently at the age of 64. He was a native of England.

LEON M. WEISS, 39, formerly an advertising representative of PIT AND QUARRY, met his death in an automobile accident in New York City recently. For the last nine years he had been advertising manager of the magazine *Linens and Domestics*.

CHARLES PASCHE, president of the Davenport-Besler Corporation passed away November 15.

JAMES B. MAHER, 49, secretary-treasurer of the Salt Lake Valley Sand & Gravel Company died at Salt Lake City recently following a heart attack.

THOMAS P. MCGRATH, 53, secretary and treasurer of the McGrath Sand & Gravel Company, died suddenly on November 26, at his home in Peoria, following a heart attack. The company's plant and offices are located at Lincoln, Illinois.

JOHN A. CALDWELL, for many years active in the management of the Cass City Sand & Gravel Company died at his home in Cass City, Michigan, recently. He was 75 years old.

J. K. BARBOUR, 63, for many years sales manager of the Standard Lime & Stone Company, Baltimore, died November 25.

Herbert Harris, 88, pioneer lime maker of Rhode Island, died recently at his home in Limerock, near Providence.

Establishment of a concrete-block and brick plant in Springfield, Illinois, is planned for the near future by C. D. Casten, owner and operator of the Clear Lake Sand & Gravel Company.

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WASHER TYPE (Illustrated), STYLE W-16

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The couplings with a 25-year record for dependable, low-cost service. Built to eliminate leaks, pressure losses and shut-downs, and to protect hose tube and ends. For high or low pressures, on steam, air or liquid lines. All parts steel or malleable iron; cadmium plated to prevent rust. Sizes ¼" to 4", inclusive.

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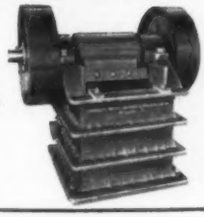
Heavy plate steel or cast steel. Heavy Duty Construction. Large capacity. Small power Requirements



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Stationary & Portable Rock and Gravel Crushing and Screening Plants—Single and Double Roll Crushers — Revolving and Vibrating Screens—Conveyors.

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Traffic News Digest

Transportation Act.—In the last issue of PIT AND QUARRY it was stated that the meeting of the House and Senate Committees on Interstate and Foreign commerce was to be held in December in an effort to "iron out" the differences between the two bodies in the transportation act passed by each during the last session of Congress. Since it has been impossible to get the members of these two committees together the meeting has been postponed until sometime in January and will be held after Congress reconvenes. While the proposed codification of the Interstate Commerce Act is still the principal difference to be ironed out, there is also developing some active opposition to regulation of water carriers by the Commission. Both the House and Senate bills provided for water carrier regulation. When the bill was before the House there was strong opposition to the provision for water carrier regulation by the Commission, but the opposition was not strong enough to eliminate this provision from the bill. Since that time opponents of this legislation have been working for its defeat. If, however, the President, the railroads and railroad labor group together with shippers, who do not benefit from unregulated water carriers, come to the support of the proposal it will be enacted. One of the most important provisions as far as it affects the majority of shippers is the rate-making rule. Both bills provide for competition between the various methods of transportation and state that in order that the public at large may enjoy the benefit and economy afforded by each type of transportation, the Commission shall permit each type of carrier or carriers to reduce rates so long as such rates maintain a compensatory return to the carrier or carriers after taking into consideration overhead and all other elements entering into the cost to the carrier or carriers for the service rendered. The House bill also provides that nothing in this paragraph shall be construed so as to affect the long-and-short-haul provision of Section 4. The railroads are objecting to that part of this provision which makes it necessary to take into consideration overhead and all other elements entering into the cost to the carrier. They claim that they will be barred from making rates to compete with highway and waterway carriers, which they claim are receiving direct and indirect public subsidies. It is not likely that the joint committee will make a report to Congress before February 1 and it will probably be March 15 or April 1 before legislation is finally enacted.

Railroad Reorganization Court.—Senate bill No. 1,869 passed at the last session would create a railroad reorganization court to permit the reorganization of railroads in receivership or operating under trustees. This bill is in the House Judiciary Committee. Since the bill was passed by the Senate conditions have changed and if carloadings hold up well during the next few months it is not likely that the bill will be passed by the House.

Postalized Rates.—At the last session the Senate passed S. J. Res. 58 authorizing the Commission to make a preliminary investigation on the advisability of the establishment of postalized passenger rates. A report is to be made to Congress of this investigation. The resolution is now before the House committee on Interstate and Foreign Commerce.

Purchase of Securities.—The Commission asked for the passage of legislation which would give it power to prevent the expenditure of railroad funds for the purchase of securities which were unnecessary for the legitimate operation of the railroad business. Senate bill No. 2,903 embodies these provisions. This bill was passed by the Senate and sent to the House where it is now before the Committee on Interstate and Foreign Commerce.

RECENT I.C.C. DECISIONS

Phospate Rock.—In order to enable applicants to meet water competition the Commission has, in response to 4th Section application No. 17,796, authorized the parties to Agent Hattendorf's I.C.C. Nos. 21 and 24 to establish and maintain during the season of open navigation on the upper Mississippi River, rates of not less than $4.70 a net ton over existing all-rail routes from New Orleans, and other gulf ports to Quincy, Illinois. The carload minimum weight is to be 50 tons and relief from the long-and-short-haul clause of Section 4 is given subject to the 50 per cent. circuity limitation. Application was made for a barge-rail rate of not less than $4.50 on like traffic between the same points, but this was denied since the Commission says that no evidence was presented with respect to this proposal. I. C. C. F. S. O. No. 13,615 phosphate rock from Gulf ports to Quincy, Illinois.

Sand and Gravel.—Six building-material dealers, having yards served exclusively by the rails of terminal carriers in the outlaying parts of the Chicago switching district, filed a complaint alleging that the rates on sand and gravel from points of origin in Illinois, In-

CLEANER MATERIALS
MORE ACCURATE SIZING

—SAY CUSTOMERS OF LARGE WESTERN FIRM USING *Simplicity* SCREENS

Recently the head of a large Aggregate Producing company in the West made this statement. — "I've always understood that Simplicity Gyrating Screens were good, but I didn't realize how good they are until after I installed that 4'x 10' triple deck screen in one of my plants. No other screen is one, two, three, when compared to a Simplicity. Hardly a day goes by without some one of my customers making some comment about how perfectly sized and cleaned my material now is. From now on its Simplicity screens for me — the best aggregate screen on the market."

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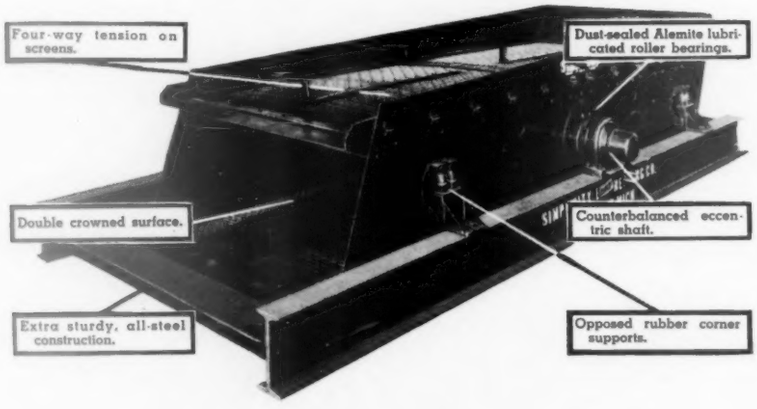

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diana and Wisconsin to their yards exceeded the rates charged to yards of their competitors located on the rails of terminal carriers in the Chicago district. They charge violation of Sections 1 and 3, and instituted a similar proceeding before the Illinois Commission. According to complainants the application of the 20-cent arbitrary provided by the Commission in Chicago Gravel Company, *v.* A. T. & S. F., 118 I. C. C. 633, on deliveries requiring the services of more than a single line, except where the second line was a belt line. They contended that the reason for establishing the arbitrary was to prevent wasteful cross hauling and that since there were no sand and gravel pits on the belt lines that this consideration should not apply on belt line deliveries. The Commission has found the rates unduly prejudicial but not unreasonable. Since no evidence was introduced relative to trackage rights or other justifications for differences in treatment in the delivery of such traffic in Chicago, no order was issued in the case. The Commission, however, said that if the undue prejudice was no removed wihin 60 days a petition might be filed for further hearing to develop the record with respect to this situation. I. C. C. docket No. 28,064, E. A. Keller & Sons *et al. v.* Alton *et al.*

In order to enable the carriers to meet water competition the Commission has authorized the Boston & Maine and other railroads to establish and maintain rates on sand and gravel in closed cars or in open cars with tarpaulin or other protective covering, c. l. min. wt. 50 tons, from Pinewald and Williamstown Junction, N. J. to Medford, Mass. of not less than $2.78 a net ton. Relief from the long-and-short-haul clause of Section 4 is authorized subject to the circuity limitation of 50 per cent. The present rate is $3.52 from Pinewald and $3.63 from Williamstown Junction. The rail and water rate from Pinewald and Williamstown Junction to Medford is $2.68. The Commission said that a rate of approximately 10 cents higher than the rail-water rate should enable applicants to compete for the traffic and that if the rail-water rate was increased that the applicants should increase their rates also. I. C. C. F. S. O. No. 13,621 Sand and Gravel to Medford, Massachusetts.

Soapstone and Talc (Southern Governors' Case).—While the widely publicized Southern Governors' Case did not directly concern any product of the nonmetallic minerals industry with the exception of soapstone and talc it has created a great deal of interest because of the fact that the complaint was filed by the governors' of several of the southern states. The findings as far as soapstone and talc are concerned are that the rates on the higher grade of talc in carloads shall be 16 per cent. of the first-class rate and on the lower grade of talc the rate shall be 13 per cent. of the first-class rate. These rates are to apply from points in the south to points in the north. From points in the north to points in the north the carload rate on the higher-grade talc is to be 22.5 per cent. of the first-class rate and on the lower grade talc 19 per cent. of the first-class rate. Dissenting opinions were filed by Commissioners Porter, Eastman, Miller and Mahaffie. Commissioners Alldredge and Patterson did not participate in the disposition of the case. The evidence presented fell into three broad divisions: First, evidence relating to the resources of the south and the industrial development and economic conditions in the north and in the south. Second, evidence showing present rates and rate structures, and their histories, within and between the south and the north, and the competitive conditions encountered in the sale in northern markets of articles named in the complaint. Third, evidence of the cost of transporting freight in the south and in the north. Chairman Eastman in his dissenting opinion said that many men in public life

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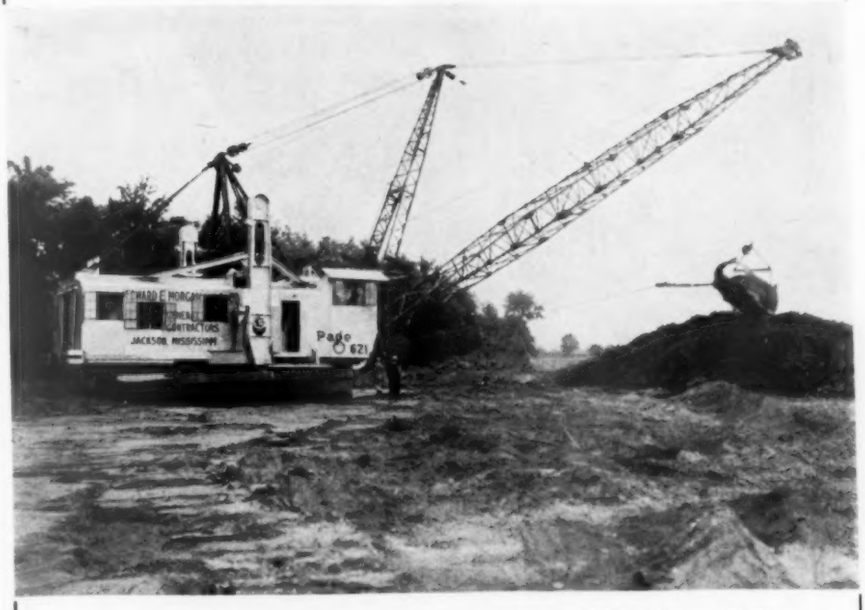

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had decided the case in advance and without regard to the record and have freely proclaimed their own views on what they conceive to be the basic issues. Their thesis has been that the section of our country generally known as the south is our "economic problem No. 1," because, among other things, it is low in industrial development, and that a major reason for this condition has been and is an unfair adjustment of freight rates which has favored the producers of the north and burdened those of the south. He said, that it has become a political issue. Since this decision has been announced there is an indication that complaints will be filed affecting other commodities from the south to the north, so that this decision is of importance in that it establishes a precedent. I. C. C. docket No. 27,746, State of Alabama *et al. v.* N. Y. C. *et al.* (embracing also I. and S. No. 4,400 Soapstone and Talc between southern and official points).

Contract Carriers.—Under a recent decision the Commission is making open for public inspection contracts of contract motor carrier that are filed with it and is requiring contract carriers to answer questionnaires giving the actual rates charged by such carriers which are to be made public. This case affects contracts carriers transporting shipments between points in Illinois, Indiana, Michigan, Ohio, and Wisconsin and points in Iowa, Kentucky, Missouri, New York, Pennsylvania and West Virginia shown in Agent H. M. Slater's tariff MF I. C. C. No. 1 The rates charged from July 1st to October 1, 1939 are to be shown in the questionnaire. The case was brought about by contract carriers claiming that such rate information was confidential and should not be disclosed. On this point the Commission said: "In deciding originally to hold the contracts filed confidential, we gave weight principally to the plea from many sources that a filing, open to the public would result in a disclosure of business secrets and other information detrimental to both shippers and carriers, contrary to the public interest and the spirit, if not actually the letter, of section 222 (e) of the act. The same arguments are renewed now by both contract carriers and the shippers' organization which was heard. Shippers and carriers on their behalf insist they should not be required to disclose such things as the location and identity of their customers, the character and volume of their purchases, the rates paid, and other business secrets which have found their way into these contracts. The carriers, particularly those offering individualized and specialized services, of which there are a substantial number, object to disclosing the character and details of their operations and their charges, saying that they are in no manner competing with common carriers, and that in many instances their charges, because of their devotion to a single shipper, exceed prevailing rates, and that disclosures would only invite competition in their exclusive and specialized fields from persons other than common carriers. Some say that the disclosures contemplated would cause rate wars; others that they would bring about an increased use of proprietary trucks by shippers unwilling to have their business secrets made available to their competitors; and others that their contracts would not, in many instances, disclose the information desired, for the reason that they do not definitely state the actual charges collectible thereunder. Some contracts are said to provide only minimum charges less than the actual charges by varying amounts, depending on the character of that particular service and the circumstances under which it is performed. Others are said to name no actual charges but to provide for a cost-plus payment, or a formula only by which charges can be determined.

"Whether or not the concracts, once they are filed with us, automatically become public records, with the consequent right of inspection by interested persons, consideration of the public interest and of the policy of the motor-carrier act requires that they be made available for such inspection. A basis principle of carrier regulation is that full publicity of a carrier's charges is necessary and desirable in the public interest. There can be no effective regulation of common carrirs until their charges are made public. Otherwise, it would be impossible to prevent rebating, discrimination, and preferences among shippers who patronize them. Although there is no prohibition in the act against discrimination or preference by a contract carrier among his patrons, yet concealment of his actual charges not only discriminates against common carriers who are thus compelled to compete with published rates against contract carriers with concealed rates, but by this very fact, promotes rate wars, undercutting, and other unfair and destructive competitive practices among common carriers as well as between common and contract carriers. No shipper can justly complain if the charges which he pays for transportation are made public. The same thing is true of the other essential provisions of the contract between the patron and the contract carrier, such as the definition of rules, practices and regulations, and terms and conditions under which the transportation will be afforded." I. C. C. docket *Ex Parte* MC 27, central territory contract carrier rates.

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Labor Decisions

Liability Law

Illinois Steel Company v. Fuller, decided by the Supreme Court of Indiana, November 6, 1939; reported at 23 N. E. (2d) 259. This case was an appeal from a judgment in damages in favor of the appellae (employee) for an alleged occupational disease contracted through the appellant company's negligence. It was the employee's duty to drain off impurities from a tank of crude benzol; during that operation, benzol fumes escaped, and the alleged occupational disease which was the basis of the suit was benzol poisoning.

Liability was asserted under the Indiana Employers' Liability Law, Section 40-1101 (Burns' 1933) or 10100-1 (Baldwin's 1934. Negligence was predicated upon the alleged failure of the appellant company to supply the employee with serviceable gas masks as required by Section 40-1011 or 10085, and in failing to provide sufficient means of ventilation, as required by Section 40-1013 or 10072.

The Supreme Court holds that an action on account of occupational disease occurring (as in this case) prior to the enactment of the Indiana Workmen's Occupational Diseases Act (Acts 1937, Chapter 69) could be maintained under the Employers' Liability Law. "The paramount purpose of the Employers' Liability Law seems to have been to restrict the use of the defense of contributory negligence, assumption of risk, and negligence of a fellow servant. As to the duties imposed upon those coming within its terms, it has been said that the act is declaratory of the common law . . . while it has been disputed, the weight of authority sustains the view that an action for negligence resulting in damages from an occupational disease was known to the common law." The Court does not recognize *In re Jeffries,* 105 Ind. App. 349, 14 N. E. (2d) 751, as authority for the conclusion that a common law action for the negligence of an employer, resulting in an occupational disease, could not have been maintained in Indiana prior to the occupational disease act of 1937. Disability from an occupational disease "may be no less an in-

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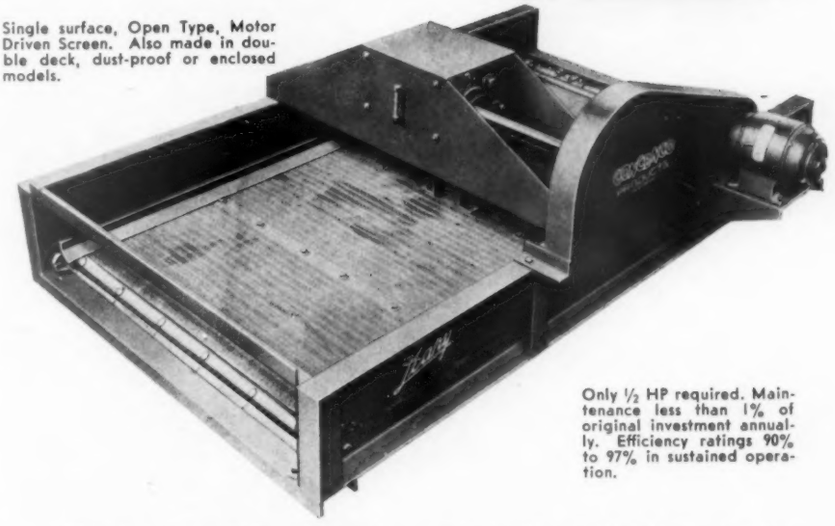

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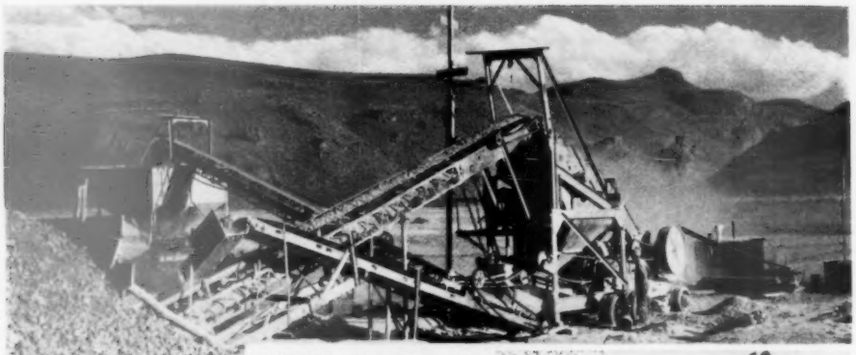

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jury [embraced by the Employers' Liability Law] than one resulting from accident."

The court further sustains the constitutionality of the statutes requiring an employer to supply "serviceable gas masks" (Section 40-1011) and to provide "sufficient means of ventilation" (Section 40-1013, 10072) as against the contention that they are "so vague and indefinite as to deny due process, under the 14th Amendment to the Federal Constitution, U. S. C. A., or to constitute a delegation of legislative power, in violation of Article 3, Section 1, of the Constitution of Indiana."

On the issues of fact it is held that the evidence sustains the findings that the employee was suffering from benzol poisoning and that such poisoning was proximately caused by the company's negligence. The judgment, accordingly, is affirmed.

Fumes

Tindall v. American Furniture Company et al., decided by the Supreme Court of North Carolina, October 18, 1939; reported at 4 S. E. (2d) 894. This was an appeal from a lower court decision affirming an award of compensation by the North Carolina Industrial Commission. The award was for the death of an employee who had worked in a finishing room, the air of which contained benzol fumes and vapors. The Supreme Court finds that there was sufficient competent evidence to support the findings of the commission that the deceased came to his death as a consequence of breathing benzol fumes in the regular course of his employment, and that his death resulted from an occupational disease caused by the exposure to benzol poisoning as a part of his employment, within the provisions of Chapter 123, North Carolina Public Acts of 1935, thus constituting an "injury by accident arising out of and in the course of his employment." The court also rules that the full commission, in reviewing the award of a single commissioner, was within its rights in refusing to hear certain additional evidence offered by the defendants.

Must Pay Royalty

The Wyoming State Land Board has upheld the opinion of J. B. Griffith, state land commissioner, that highway contractors must pay 2 cents a ton royalty for all gravel taken from state lands.

In bidding on highway contracts the contractors merely add the cost of the royalty to their bids. Thus, one state department pays just that much to another department, the ultimate beneficiary being the state's school fund.

Occupational Diseases and the Law

Interference

Building Service Employees Local No. 59 v. Newhouse Realty Company et al., decided by the Supreme Court of Utah, November 1, 1939; reported at 95 Pac. (2d) 507. This was the first case under the Utah "Little Wagner Act" (Chapter 55, Laws of Utah, 1937, also known as the Utah Labor Relations Act) to reach the Supreme Court of that state. It was an appeal from the action of the Utah Labor Relations Board in dismissing charges filed by the plaintiff, an "outside union," against the defendant company, and the issues chiefly involved the legality of alleged interference with the employee's right of self-organization and collective bargaining. The board, according to the court's majority opinion, concluded that certain supervisory employees who played a part in the forming of a so-called company union composed exclusively of defendant's employees "were not acting in their capacities as officers of the company but were acting in their own behalf to protect their own positions and others," and that some of the bargaining agents who were supervisory officers were satisfactory because they had been selected by the employees. On these and other disputed findings, the court rules that there was sufficient evidence to support such findings, and the action of the Board is affirmed.

Justice Wolfe in a dissenting opinion maintains that the board did not make a finding on the question of whether the conduct of the supervisory employees was "interference" as is meant by the Act, that the prevailing opinion "unwittingly presumed that the Board did make such implied findings" and that "the prevailing opinion in this case goes a long way to thwart the purposes of the Act and nullify the law."

Contempt Proceedings

National Labor Relations Board v. Pacific Greyhound Lines, Inc., decided by the U. S. Circuit Court of Appeals, Ninth Circuit, September 19 (amended September 29), 1939; reported at 106 Fed. (2d) 867. Late in 1936 the court

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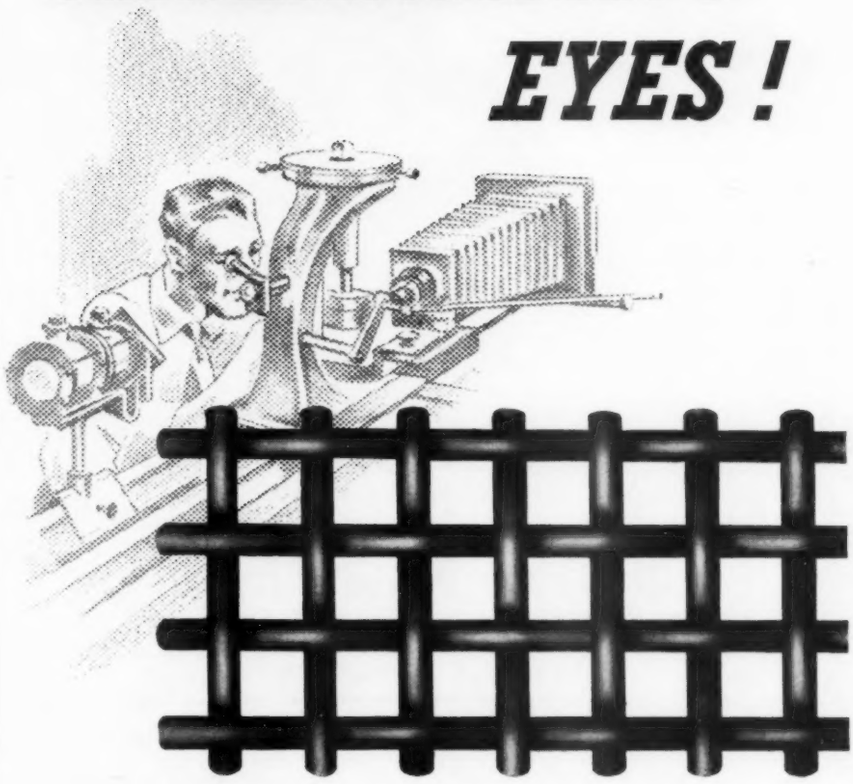

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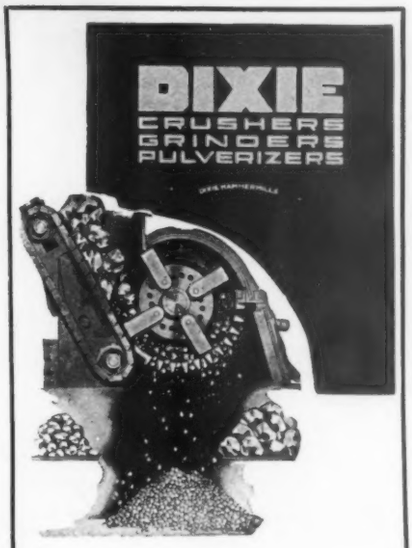
confirmed a cease and desist order whereby the National Labor Relations Board ordered the defendant company to cease discouraging membership in a trade union, from interfering with or contributing support to a union of its own choosing, or, generally, from interfering with the employees' rights of self-organization. Subsequently the company entered into a series of agreements with a union representing its employees. At later elections, that union failed to receive a majority of votes, but the union which was selected as bargaining agent did not request any change in the existing contract. The company by various acts has urged the employees to remain or become members of the union with which its agreements were made and has aided that union in various ways. The Board, in this proceeding, asks that the company be held in contempt of court for violating the cease and desist order.

The court holds, however, that if it were to hold that the cease and desist order ordered the company to cease and desist from acts committed eighteen months later, claimed to be justified by the contract with the union, it would transfer from the Board to the court the original consideration of a great number of controversies which the Act provides the Board shall hear and determine. The petition, accordingly, was dismissed.

Jurisdiction

International Brotherhood of Teamsters, Chauffeurs, Stablemen and Helpers et al. v. International Union of United Brewery, Flour, Cereal and Soft Drink Workers of America et al., decided by the U. S. Circuit Court of Appeals, Ninth Circuit, September 19, 1939, as amended on denial of rehearing November 8, 1939; reported at 106 Fed. (2d) 871. This was an appeal from a declaratory judgment of a U. S. District Court that the Brewery Workers' Union is the sole bargaining agent for certain employees of certain breweries in California, Oregon and Washington, and an injunction restraining the Teamsters' Union from interfering with the employer-employee relationship of the breweries and brewery workers, or the breweries' business. The court rules that since Congress has established an administrative tribunal (the National Labor Relations Board) for determining the controversy concerning the bargaining agent, the decision of that tribunal, and not the Federal court, should first have been sought. The declaratory judgment, consequently, is reversed. The injunction is likewise reversed, on the ground that the controversy was a labor dispute



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within the provisions of the Norris-La Guardia Act; but permission is granted to amend the pleadings, if so advised, to show facts bringing the case within the exceptions respecting fraud and violence in the Norris-La Guardia Act and to show a combination or conspiracy in restraint of interstate commerce.

Sit-Down Strike

McNeely & Price Company v. National Labor Relations Board, decided by the U. S. Circuit Court of Appeals, Third Circuit, September 21, 1939; reported at 106 Fed. (2d) 878. This was an appeal from an order of the National Labor Relations Board directing the reinstatement of individuals who had participated in a sit-down strike. The order was based on distinctions between this case and the *Fansteel* case decided by the U. S. Supreme Court (306 U. S. 240, 59 S. Ct. 490). The Court, however, rules that the asserted distinctions do not hold, and the order is modified so as to eliminate the requirement that individuals who had participated in the sit-down strike be reinstated. The Court rules that it was not material that the employer did not (as was done in the *Fansteel* case) make a formal notice of discharge of the "sit-downers," nor that the men in the plant did not violently resist the order of the state court requiring them to depart.

Arbitration

Uneeda Credit Clothing Stores, Inc., et al., v. Briskin et al., decided by the New York Supreme Court, Special Term, King's County, August 16, 1939; reported at 14 N. Y. S. (2d) 964. The plaintiff in this case was an employer which had a collective bargaining agreement with a union representing its employees, providing (among other things) for arbitration of disputes. The employer discontinued a department of the business and suspended the services of the employees in that department. The union demanded that the employees be reinstated and, when that demand was refused, called a strike and proceeded to picket the place. The Court holds that the union is bound by its agreement not to call a strike or to picket until the agreed condition of arbitration has been fulfilled; and that the employer was not bound to accept the union's demand that the employees be reinstated before the dispute would be arbitrated. An injunction was ordered to restrain all picketing until the determination of the arbitration or the trial of the action if the dispute is not arbitrated.

The National Wire Cloth Company is building an addition to its plant at St. Paul. The company manufactures special abrasion-resisting screen cloth as well as standard cloths in all meshes for all screening purposes.

Trade Literature

Truck and Trailer Size and Weight Restrictions, 1940. 54 pages. Four Wheel Drive Auto Company, Clintonville, Wisconsin.

200 Ampere Shield-Arc Junior Welder. 4 pages. Lincoln Electric Company, Cleveland.

Page Automatic Dragline Buckets. 8 pages. Page Engineering Company, Chicago.

Haiss Model 80 Loader. 8 pages. George Haiss Manufacturing Company, New York.

The New Line of Portable Compressors. 32 pages. Ingersoll-Rand Company, New York.

Cable Digest, 20 pages. *New D-C Magnetic Starter,* 4 pages. General Electric Company, Schenectady, New York.

Gyroset Vibrating Screens. 8 pages. Productive Equipment Corporation, Chicago.

Car Pullers, Hoists and Winches. 8 pages. Stephens-Adamson Manufacturing Company, Aurora, Illinois.

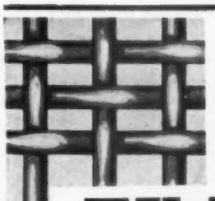
Bay City Model 55 Excavators, 8 pages. *Bay City Truck Crane,* 8 pages. Bay City Shovels, Inc., Bay City, Michigan.

There's a Butler Bin for Every Job. 20 pages. Butler Bin Company, Waukesha, Wisconsin.

The 16V Duplex Vibrator Plant. 4 pages. Pioneer Engineering Works, Minneapolis.

Automatic Tension Short Center Pivoted-Motor Leather Belt Drives. 140 pages. American Leather Belting Association, New York.

Patterson Pebble and Ball Mills. 32 pages. Patterson Foundry & Machine Company, East Liverpool, Ohio.



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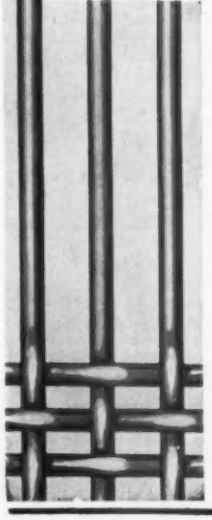

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RECENT BOOKS

REINFORCED CONCRETE CONSTRUCTION, *by M. T. Cantell. Chemical Publishing Company, 148 La Fayette Street, New York. Price $3.00.*

This work will enable students, operators and others to obtain a practical knowledge of reinforced concrete and its application in designing the principal members of modern structures. Well acquainted with the difficulty in studying work involving algebraic equations, the author has used simple mathematics throughout which practical persons can easily follow. The symbols used are those common in American practice, the meaning of each being given as they are introduced in the various problems. The theory is simply explained and the examples of designing carefully graduated. Illustrations are given only where considered necessary to clearly exemplify the work.

COMPANY PROBLEMS UNDER WAGES AND HOURS LEGISLATION, *32 pages, price 75 cents.* EMPLOYER ASSOCIATION IN COLLECTIVE BARGAINING, *28 pages, price 50 cents.* MANAGEMENT'S RESPONSIBILITIES IN INDUSTRIAL RELATIONS, *16 pages, price 25 cents. American Management Association, 330 West 42nd Street, New York.*

Part of a "personnel series" of booklets published as an aid to management in solving current problems involving employee personnel.

TRACTOR REPAIR AND MAINTENANCE, *by R. I. Shawl. The University of Illinois, Urbana, Illinois. 57 pages.*

With each tractor sold, the maker supplies a booklet of instructions. This book is intended to supplement such instructions and deals in problems of repair and maintenance common to all tractors. Tells what to look for in checking to see that the parts are in proper working order and gives detailed directions for adjustment and repair. The qualities of fuels, oils, and others supplies, and their suitability for use under different operating conditions are also discussed.

INDUSTRIAL HEALTH—ASSET OR LIABILITY, *by Dr. C. O. Sappington. Published by Industrial Commentaries, 160 North La Salle Street, Chicago. 306 pages. Price $3.75.*

This book is especially timely in view of the current interest of American industry in the matter of improved health of workers, both as a means of increasing efficiency, and hence attaining more profitable operations, and as a means of securing greater public good will.

Both for the industrial medical practitioner, as well as for the industrial executive, this is an invaluable contribution, and particularly for the latter. For it is a book which is extremely practical in characteristics and presentation. Not only does it indicate to industrialists the practicability of improved industrial health in terms of dollars and cents and in terms of good will, but it also sets forth in an almost specific fashion, just what procedures are necessary in order to develop and to maintain a proper and effective industrial-health program.

Furthermore, the book should prove exceptionally interesting and valuable to the average progressive and aggressive citizen, not only because the material contained there is of importance to him, but also because the problem of industrial health merits the attention of every employee as well as it does of every business executive.

INCORPORATIONS

CERTIFIED CONCRETE CORPORATION, Lynchburg, Virginia. 300 shares no-par-value common stock. R. E. Graves, president; 309 Law Building, Lynchburg.

THOMPSON SILICA COMPANY, Thompson, Ohio. Capital: $25,000. Incorporators: Leon Fredebaugh, M. N. Goodrich and Mildred Webster.

REDFORD SAND COMPANY, Detroit, Michigan. 5,000 no-par-value shares. L. B. Murdock, 16709 Pierson Avenue, president.

GOLDEN WEST QUARRY, INC., San Francisco, California. Capital: $50,000.

SANTEE LIMESTONE COMPANY has been incorporated in Holly Hill, South Carolina, by H. P. Hollinger, J. G. Benson and others.

MONTELLO QUARRIES, INC., Montello, Wisconsin, has been chartered by L. H. Bancroft, Winifred Bancroft and Lorin L. Kay.

BADGER ROCK WOOL BLOWING COMPANY, Inc., has been chartered in Milwaukee, Wisconsin, to manufacture insulating material, by B. M. Homac, Rose Olson, Loraine Swosinski and E. H. Magnuson.

WEST LAKE QUARRY & MATERIAL COMPANY has been incorporated in Clayton, Missouri, with a capital of $10,000, by V. R. Cruse, L. P. Trump and others.

TETON PHOSPHATE COMPANY, Boise, Idaho. Capital: 50,000 shares $1 common stock. E. G. Rosenheim, attorney.

AMERICAN SLATE COMPANY, Arvonia, Virginia. Maximum capital: $50,000. John O. Dahlgren secretary, Normandy Building, Washington, D. C.

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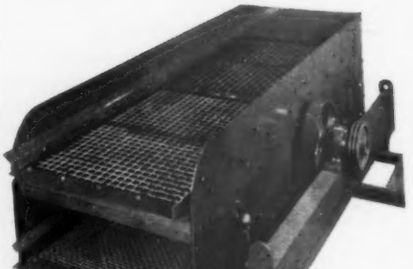

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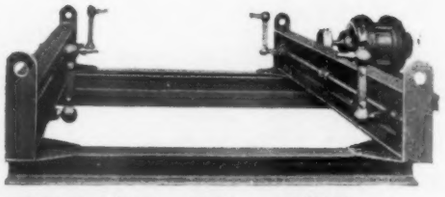

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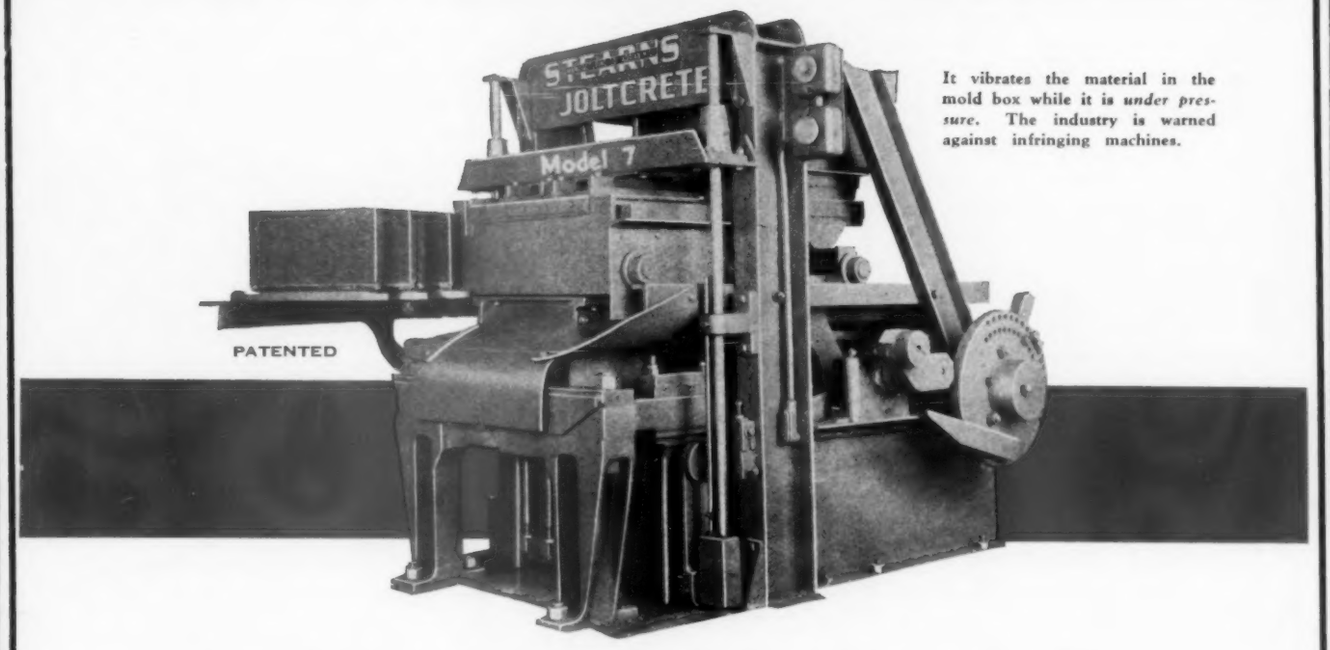
The CONCRETE MANUFACTURER
A Special Section of ... IT PAYS



It vibrates the material in the mold box while it is *under pressure*. The industry is warned against infringing machines.

What would a plant do with *two* Joltcretes?

One Stearns Joltcrete makes more blocks than any of the seventy odd owners of such machines ever made on one machine before. But invariably, the introduction of Joltcrete blocks on the market puts the Joltcrete operator out in front of competition. The demand grows to exceed even the high production of a Stearns Joltcrete—and nine outstanding plants now operate two Stearns Joltcrete Machines.

These leading products manufacturers operate *two* Stearns Joltcrete Machines:

Bronx, N. Y.—Precrete Masonry Products Inc. (formerly Mahlstedt Materials Inc.)
Bronx, N. Y.—Concrete Units, Inc.
Harrisburg, Pa.—Harrisburg Bldg. Units Co.
Indianapolis, Ind.—Spickelmier Fuel & Supply Co.
Ogallalla, Nebr.—A. H. Rend Co.
Omaha, Nebr.—Ideal Cement Stone Co.
Roanoke, Va.—Cinder Block Inc. of Ronnoke.
Wauwatosa, Wisc.—Economy Block Co.
York, Pa—Standard Concrete Products Co.

There is a vast difference in various forms of vibration. *Only Stearns Joltcrete has been proven.*

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MANUFACTURING CO. - ADRIAN, MICH.
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The CONCRETE MANUFACTURER

January, 1940

A SPECIAL SECTION OF PIT AND QUARRY DEVOTED TO PRODUCTION MARKETING AND USES OF CONCRETE PRODUCTS AND READY-MIXED CONCRETE

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Vice-President and Directing Editor

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W. E. TRAUFFER

Assistant Editor:
HARRY F. UTLEY

Circulation Manager:
W. T. KLUSSMAN

Advertising Manager:
JAMES E. MONTGOMERY
Telephone HARrison 9357
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Concrete Block Revetments Found Superior to Sand Bags as Protection from Air Raiders

Concrete blocks are playing an important part in air-raid protection in England. The December, 1939, issue of *Concrete Building and Concrete Products,* published in London, is devoted almost entirely to the use of the material, not only in the construction of shelters underground but above ground as well. In many instances it has been shown that blocks, laid up in the form of revetments with or without mortar but with the hollow sections filled with sand, are much more efficient from a protective standpoint than sand bags. Such a revetment is easy to tear down at the end of hostilities and the units made available for construction use. One of the articles on the subject declares:

"In all vulnerable parts of the country, and in many districts where the possibility of aërial attack is very remote, on the outbreak of war emergency protection was afforded to many buildings by means of sandbag revetments. Speed of erection was the main appeal of this type of protection, but the rotting of the sandbags provided at high cost, and the consequent danger of the collapse of the revetments, indicate the need of something of a more permanent nature. Already many of these stacks of sandbags have had to be replaced, in other cases they have been taken down and re-stacked on a wooden platform to prevent the bottom bags being continuously wet, and tarpaulins, building paper, or similar materials are being used to keep the rain from the top of the stack. Moreover, sandbag protection is always unsightly.

"A good revetment is one which should be reasonable in price and likely to last for the duration of hostilities. It should be easy to erect, and not difficult to demolish at the end of the war. It should be stable, give protection against blast and splinters, and should be constructed of materials readily available in most districts. Another point which may be a deciding factor in many cases is how far use can be made of the sand or other filling material already on the site.

"The most satisfactory revetments from every point of view can be made with hollow concrete blocks. The British Standard Specification for hollow concrete blocks requires the size to be 17¾ inches long by 8¾ inches high by various thicknessses up to 9 inches. The molds of most standard block-making machines produce blocks of this size. If handmolds are made for the purpose they could be 18 by 9 by 9 inches, as the allowance for mortar joints will not be necessary for these revetments. A suitable thickness for the walls of the block would be 2 inches, and there should be a 2-inch thick web across the center. The edges may have tongue-and-groove joints to give the revetment a certain amount of rigidity, or they may have plain edges and be set in mortar to give rigidity and prevent the sand escaping between the joints. If the joints are required to be mortared a 1:5 cement-sand mix should be used. A weak mortar will facilitate the dismantling of the revetment.

"A revetment made with these blocks should preferably be 18 inches in thickness, in which case they should be laid as headers and stretchers. For a 9-inch revetment the blocks should be laid to break joint. The cavities in the blocks should be filled with sand or other available material which, in cases where rotted sandbags are replaced, would be available on the site. It has frequently been stated that the presence of stones in a sandbag is a source of danger, because these stones would 'fly about and become missiles.' This may be true, but it is contrary to experience in France in the last war when sandbags were filled with soil as excavated from the trenches. If a bomb or shell dropped near enough to the sand-bagging it blew the whole thing up or over."

■

Erects Modernistic Plant

A new plant built along modern, functional lines is to be erected at Providence, Rhode Island, by the Cinder Products Corporation. The cost of the building and new equipment is estimated at $25,000.

Included in the equipment installed will be a new production machine, a Kent-Root Vibra-Press. New curing tunnels are also to be built.

The company's plant was badly damaged in 1938 by the hurricane which visited the New England states.

1939 in Review

Concrete Products

MAKERS of concrete products experienced one of their most active years in a decade during 1939. Increased residential construction volume and a decided effort on the part of many producers toward better merchandising methods helped swell the volume of output. Many new concerns entered the field, especially among the aggregates producers, and the value of the 1939 output is estimated at about $75,000,000, comparing quite favorably with $92,901,000 in the "peak" year of good prices in 1929 and being far above the lowest figure of $20,538,000 reported for 1933 by the Census of Manufactures, U. S. Department of Commerce (See Table I).

Masonry units were in good demand throughout the country, with lightweight blocks made with manufactured aggregates of expanded shale or slag increasing sharply in popularity. Concrete bricks continued to gain at the expense of the clay product, concrete pipe was in excellent demand especially on sewerage and water projects built with the aid of Federal funds and for irrigation purposes in the far West and the Rio Grande Valley in Texas. Concrete-masonry units also found increasing favor during the year in the Pacific Northwest and the Southeast where cheap local lumber has always been favored and some progress has also been made in replacing adobe in some of the southwestern states. Prices were "spotty," being excellent in some localities but generally ranging from fair to good.

The many operators who installed vibration production equipment during the year had their judgment verified following the release of the extremely interesting report of the tamping-versus-vibration tests at the University of Wisconsin in November. (*P&Q*, December, 1939, page 74.)

One of the outstanding plants that went into operation during the year was that of the Currier Lumber Company in Detroit. Occupying a site of approximately two city blocks, the plant employs mechanized line-production methods, automatic batching and undercover storage of cured units. Two automatic strippers manufacture the blocks, all being gravel-concrete. The gravel is purchased and trucked to the plant. Three Lewis-Shepard jack-lifts handle the racks into six curing tunnels, while a gasoline-electric hoist equipped with a Ready Power unit, which the operator rides, transports the racks of cured units to the covered storage yard which occupies an area of about 30,000 square feet. The yard pavement and plant floors are of concrete and the plant has an estimated capacity of nearly 5,000,000 units annually (*P&Q*, July, 1939, page 104).

Early in the year the Cemenstone

Gasoline-electric lift truck handles racks of cured units at the Currier Lumber Company plant in Detroit.

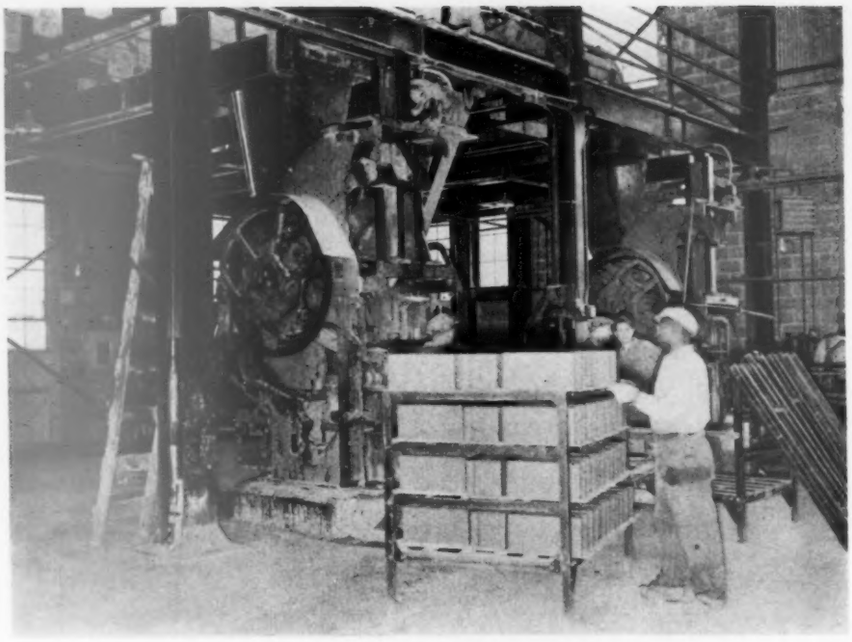
Diesel-driven portable pipe plant set up at Harrisburg, Illinois, by the Nelson Concrete Culvert Company.

Table I—STATISTICS OF THE CONCRETE-PRODUCTS INDUSTRY

(Source: Census of Manufactures, U. S. Department of Commerce)

Year	Number of Plants	Cost of Materials, Supplies, Fuel and Power	Value of Products
1914	3,548	$8,904,000	$21,934,000
1925	1,666	27,792,000	75,214,000
1927	2,330	33,913,000	93,259,000
1929	2,438	34,035,000	92,901,000
1933	766	9,289,000	20,538,000
1935	1,224	20,110,000	44,967,000
1937	1,382	35,453,152	76,173,865
1939	1,550[1]	35,000,000[1]	75,000,000[1]

[1] Estimated.



Automatic strippers in the new plant of the Currier Lumber Company.

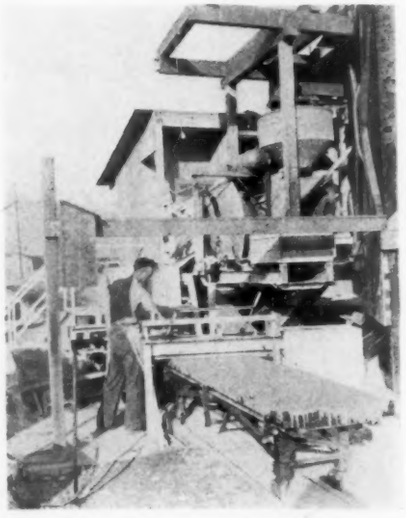
Corporation was formed at Pittsburgh, headed by W. P. Witherow, president of the Blaw-Knox Company. The company's aim is to standardize on a nation-wide scale the sizes, shapes, strength and durability of concrete-building units. The system would provide standards for precast concrete such as have been developed for steel. The firm's first licensee is the D. J. Kennedy Company of Pittsburgh.

At Portland the Oregon Culvert & Pipe Company erected a new concrete-pipe plant, the equipment including a Tuerck-Mackenzie pipe machine, complete with mixer and skip. Pipes from 3 to 6 inches in diameter are made. A Miles stripper and a Blystone mixer were installed in the new block plant of the Schrader Dredging Company at San Pierre, Indiana.

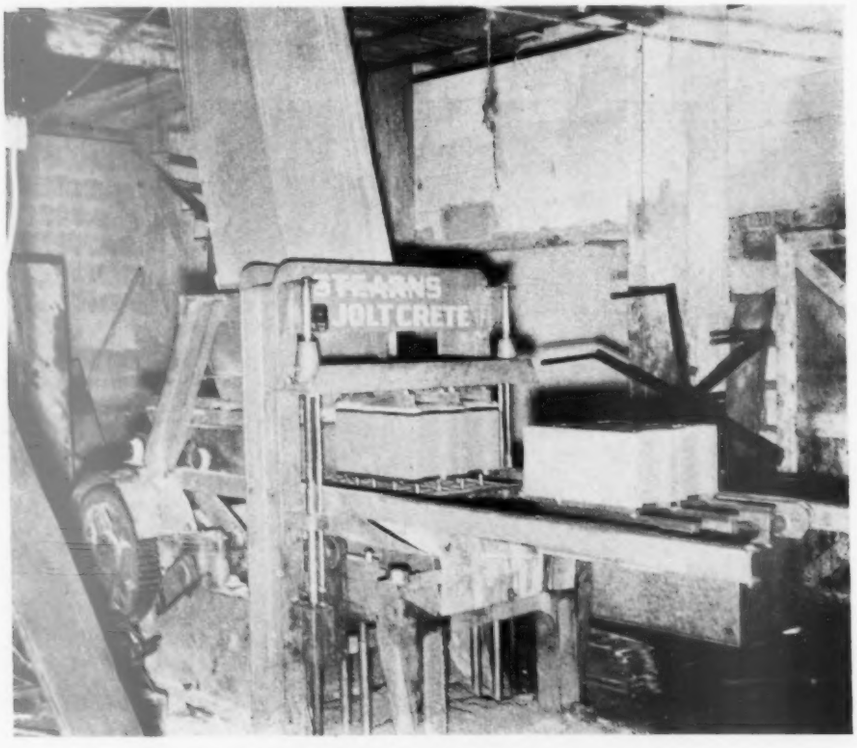
To serve an extensive W.P.A. sewer project at Harrisburg, Illinois, the Nelson Concrete Culvert Company of East St. Louis installed a complete portable concrete-pipe plant, delivered to the site by the Concrete Pipe Machinery Company. The plant, powered by an 85-horsepower Cummins Diesel engine, produces pipe sections up to 36 inches in diameter (*P&Q*, November, 1939, page 73).

In June the Dunbrik & Dunstone Company began operations at its new plant in Duluth, while improvements, including the installation of a Dunbrik machine were made at the plant operated at Grayville, Illinois, by the Eastwood Sand & Gravel Company. The Turner Gravel Company, San Antonio, Texas, long established sand-and-gravel and ready-mixed-concrete producer, also installed a Dunbrik machine.

Specializing in the quantity production of concrete joists for large build-



Building units being made by vibration face-up on moving cars at the Niles plant of Pacific Coast Aggregates, Inc.



Vibration machine serving plant of the Blissfield Builders' Supply Company.

ings, the Precast Unit Company of Kalamazoo, Michigan, enjoyed one of the most prosperous years in its history, its Lith-I-Bar machines producing over 400,000 feet—nearly 80 miles—of joists for institutional and other large structures during the year.

"Glastone," a Haydite concrete block faced with Vitrolite structural glass, was developed by the Libbey-Owens-Ford Glass Company as a decorative, load-bearing unit. No commercial production has been reported.

The Lock Joint Pipe Company of Ampere, New Jersey, largest of the on-the-job concrete-pipe builders, experienced an active year, one of its large jobs having been the furnishing of reinforced pressure pipe up to 150 inches in diameter for the Wachusetts Aqueduct project in Massachusetts. Two special plants were set up for this job. Concrete buckets to fill the huge forms were handled by American locomotive

Curing room at the Berger plant in Detroit. Inset at left shows type of fog nozzles used.

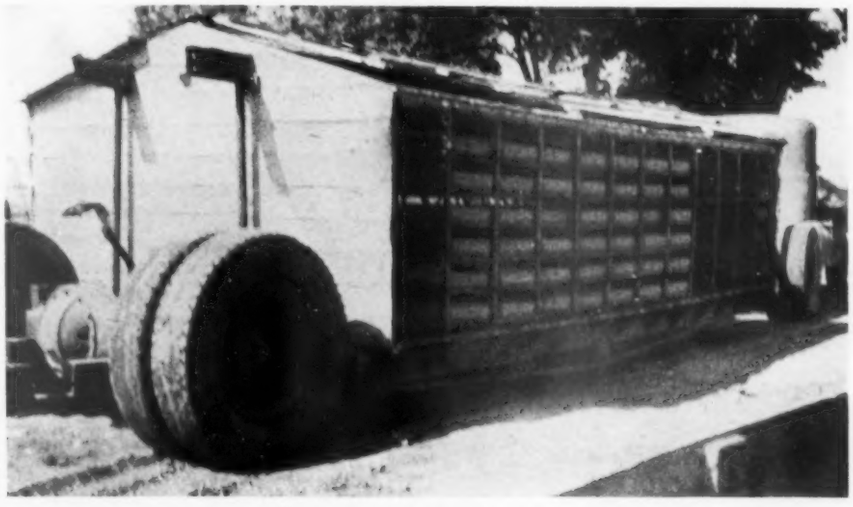
Two new undercover storage structures, a system of concrete runways, new curing-room facilities, a plant addition and a new Stearns mixer were some of the improvements undertaken in 1939 at the plant of the Concrete Products Corporation at South Bend, Indiana. The company manufactures cinder, Waylite and gravel blocks, and concrete joists. (*P&Q*, August, 1939, page 69.)

Despite the fact Blissfield, Michigan, has a population of but 2,000, the plant of the Blissfield Builders' Supply Company has been producing up to $350 worth of blocks daily since it installed its No. 7 Stearns Joltcrete machine early in the year. Deliveries are made as far away as Toledo.

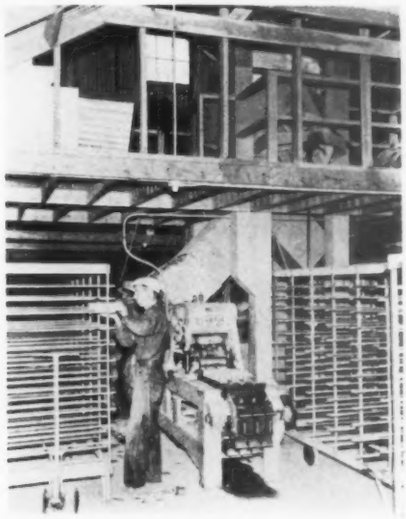
The Western Brick Company of Danville, Illinois, installed a No. 9 Joltcrete in the spring to manufacture Haydite blocks. This company, incidentally, also manufactures the Haydite

cranes, and electric vibrators compacted the concrete. Deliveries were made by special low-bed trailers pulled by Sterling tractors powered with 150-horsepower Cummins Diesel engines. The hauls averaged about 7 miles (*P&Q*, September, 1939, page 68).

An innovation in curing procedure, the use of portable canvas-covered steam rooms, is employed at the new silo-stave plant operated by Gale Briggs at Charlotte, Michigan, for the Michigan Silo Company. The curing vehicles are backed up to the stave tamper, filled, pulled out and the steam connected. The next day they are hauled into the yard and the cycle repeated. There are two of these "curing trailers," each having a capacity of about 400 staves and pallets, weighing 28 tons. (*P&Q*, September, 1939, page 72.)



Trailer-type steam-curing rooms are used in the stave plant operated by Gale Briggs at Charlotte, Michigan.



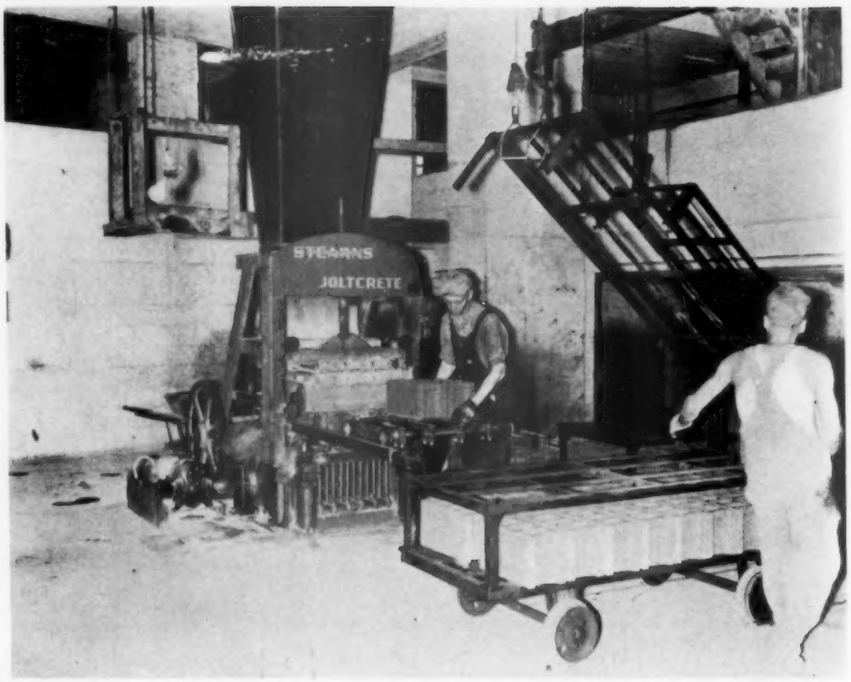
Brick machine and related equipment in the Denver plant of Magnuson Brick Company.

Concrete joists being made by continuous production methods at the plant of Graham Bros., Los Angeles, Cal.

at its shale-brick operations a short distance away.

More than two score other plants installed Joltcrete machines during the year. Included in the installations were: Harrisburg Building Units Company, Harrisburg, Pennsylvania; Badger Concrete Company, Oshkosh, Wisconsin; Cinder Concrete Products, Inc., Denver; Tri-State Cemroc Company, Covington, Kentucky; George W. Katterjohn & Son, Paducah; Concrete Products Company, Dubuque; Hudson Supply & Equipment Company, Washington, D. C.; Reimers-Kaufman Company, Lincoln, Nebraska; Cement Products Company, Savannah, Georgia; Nassau Concrete Products Company, Baldwin, New York; C. F. Lytle Company, Sioux City, Iowa; and the Acker Cement Products Company, Fort Wayne, Indiana.

A new vibrating block machine operated by the Boulder City Builders Supply Company, Boulder City, Nevada.



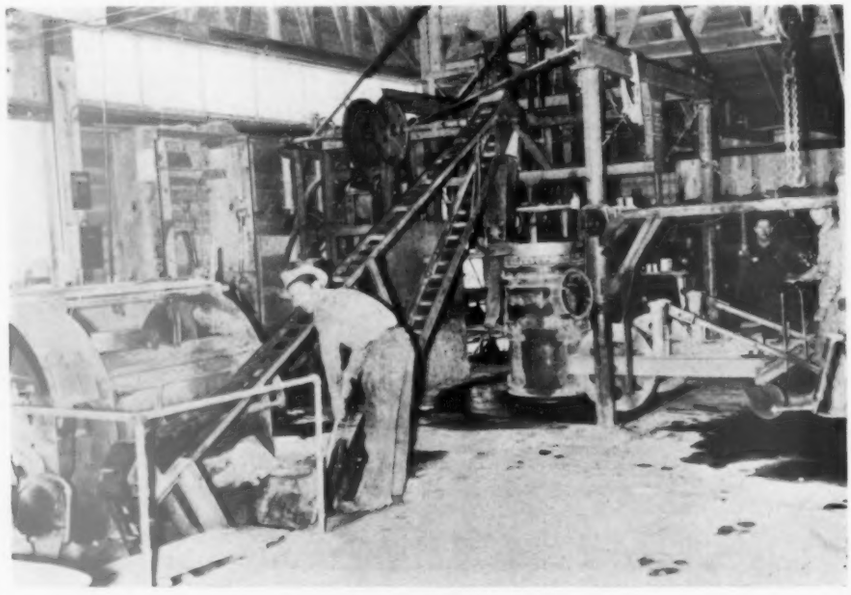
Vibration machine and hinged-deck racks in the Ideal Cement Stone Company plant at Omaha.

Pacific Coast Aggregates, Inc., on July 1, 1939, put into operation a new plant for the manufacture of "Underdown" building units near its sand-and-gravel plant at Niles, California. These units are improved over those previously made in its Oakland plant which this new operation replaces. All units are 12 inches high and they are made in lengths of from 18 to 36 inches. Two units are required, one for the inner and one for the outer wall, and these can be spaced to give any desired wall thickness from 8 inches up. These units are reinforced longitudinally and hooks on the ends of the reinforcing can be wired together to give horizontal wall reinforcing. Lugs on the units provide space for vertical reinforcing around which concrete is poured.

The Underdown units are made face-up on special molds mounted on cars which are pulled by cable around an endless track. The concrete is vibrated into the molds as they pass under the machine and the surfaces can then be finished as desired. Practice is to make a full set of units late in the afternoon and strip them the following day. A monorail hoist is used to remove a complete set of molds and move them outside to special supports from which the units are taken and stacked in piles.

Another interesting development is the method used by Graham Brothers, Los Angeles, California, to manufacture concrete joists. Work was begun in 1938 at an experimental plant where the process was perfected and the present plant was put into operation in September, 1939. Although built with the intention of supplying joists for local building work most of the output to date has been purlins, girders and struts to roof over a 3.9 acre reservoir being built for the city of Ventura, 70 miles away.

The joists and other units are made on steel strip pallets with the usual side forms and separators. These are mounted on a vibrating table itself mounted on wheels on rails paralleling the storage space. Concrete is discharged from a mixer into a special tilting bucket which travels the length of



The mixer and pipe machine operated by the Tellyer Concrete Pipe Company, Albuquerque.

the table. Upon completion the units are pulled out of the forms and separators on the pallets and lined up in storage. Later a crane neatly stacks them pending delivery.

The year was also marked by the reentry into the concrete building units field of J. W. Magnuson. His new Dunbrik plant in Denver went into operation in June, 1939. Mr. Magnuson made granite-face and regular blocks in Pueblo shortly after the turn of the century and later operated the Brighton Hydrostone Company at Brighton, Colorado. In recent years he has been active in the production of non-metallic minerals and operates the Feldspar Milling Company.

The Tellyer Concrete Pipe Company now operates the plant in Albuquerque, built by the Gifford-Hill Company a year ago. Equipment includes a 24-cubic foot mixer, a Quinn heavy-duty pipe machine for 12 to 72-inch pipe and an old tamper machine for 4 to 18-inch pipe. Most sales are made to highway and irrigation projects.

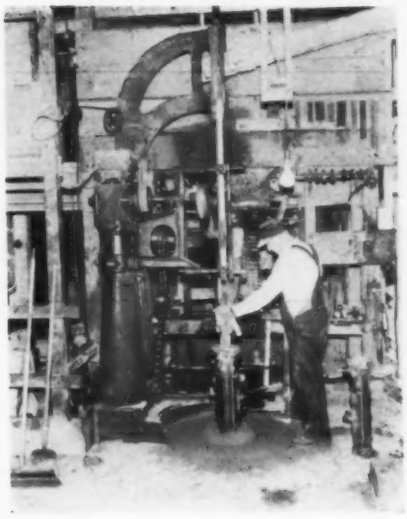
Tractor loading huge pipe sections on trailers at the Lock Joint plant serving the Wachusetts Aqueduct.

Gasoline-powered lift-truck saves time and labor for the Martin Berger Cement Block Company, Detroit.

The Boulder City Builders Supply Co., Boulder City, Nevada, went into the concrete-block business in 1932 to supply material for buildings to house many of the workers on Boulder Dam. Since completion of the dam the development of tourist and recreational facilities has taken the production of the plant. A Flam vibrating block machine installed when the plant was built was recently replaced with the latest type of Flam machine.

The Ideal Cement Stone Co., Omaha, has been a producer of concrete block since 1906 and in 1908 installed its first power tamper. It is only fitting that this company should be one of the first to adopt the new vibrating machines now available. Early in 1939 this company installed two Stearns Joltcrete machines and a Stearns 3-bag mixer. All sizes of blocks including end blocks and partial blocks are made on these machines. All blocks are made with hand holds and have mortar grooves all the way around both front and back. This company also makes concrete joists on an R & L machine, concrete brick, cinder blocks, chimney blocks, etc., all on separate older machines. Bird baths and other ornamental products are made by hand. Cast stone products include copings, sills, lintels, etc., but no trim stone is made.

Fog nozzles originally designed for greenhouse service were tried out by Ray Berger, general manager, Martin Berger Cement Block Company, Detroit, in the plant's curing rooms. They proved so successful that the nozzles, made by White Showers, Inc., Detroit, have been adopted by several other middle-western block makers. The Berger firm is handling its racked units with a Clark Truc-Lift, a gasoline-powered hoisting and trucking vehicle. Mr. Berger reports that one man and the Truc-Lift do as much work as three men formerly did with hand-lift trucks (*P&Q*, June, 1939, p. 68).



Making 3-inch bell-and-spigot pipe. Oregon Pipe & Culvert Company, Portland.

A Multiplex power tamper, mixer and concrete elevator were chosen as production equipment in the plant operated by the Coöperative Lumber Company at Cissna Park, Illinois, which has just completed its first year of operation. The plant serves a prosperous farm community in the heart of the corn belt. A Barrett lift-truck handles the racks (*P&Q*, May, 1939, page 67.) Another Multiplex-equipped plant that entered the ranks as a new producer last year was the Lake Shore Cement Products Company of Michigan City, Indiana. Waylite and gravel

Pouring yard and plant of Lock Joint Pipe Company on Wachusetts Aqueduct project.

Concrete brick being made on sand-lime-brick press, Atlantic Brick & Tile Company, Watertown, Massachusetts.

units are produced. Others installing Multiplex equipment during 1939 included the Cecil Block Company and Roy Talcott, Detroit; the J. & M. Block Company, Dexter, Michigan; Evans Brothers, Zanesville, Ohio; H. M. Pringle, Irvin, Pennsylvania; and Roy Sias, Midland, Michigan.

The Crume Brick Company, Dayton, Ohio, for many years engaged in the manufacture of sand-lime bricks, changed its product—but not its equipment—and is now turning out concrete bricks. The 12-mold Jackson & Church rotary press formerly used is just as well suited to concrete-brick manufacture as is the other Jackson & Church machinery installed in this plant. The brick press has a capacity of 3,000 units per hour. No pallets are used and curing is completed in 8 to 10 hours in the high-pressure-steam cylinders.

The Atlantic Brick and Tile Co., Watertown, Massachusetts, is now also producing concrete bricks on its two Jackson & Church sand-lime-brick presses. These are also pressure cured.

The Universal Concrete Pipe Company of Columbus, Ohio, erected another plant, the twelfth in its chain, at Youngstown. Pipes are made on a Universal tamp-type machine. One of the newest, most modern plants in the east is that of the Delaware Cement Products Company, erected during the year at Seaford, Delaware.

The National Cement Products Company, Toledo, installed a New Holland roll-crusher to crush cinders used as aggregate, while another Toledo concern, the Columbia Concrete Block & Supply Company reported the use of electrically-heated coils in its joist forms to speed up curing and increase output through the quick release of joist forms.

The Marietta Concrete Corporation established another concrete-stave plant just outside Schenectady, New York. The West Bend (Wisconsin) Concrete Products Company opened its second block plant, this one at Menominee Falls.

The Poston-Springfield Brick Company, Springfield, Illinois, long engaged in the manufacture of vitrified paving bricks, entered the field as a concrete-units maker. The Concrete Products Company of Rock Island, Illinois, installed a J. B. Foote "hammered-concrete" stripper, one of the newer small vibrating machines.

Burial Vault Assn. to Convene in Cincinnati

Three days will be devoted to the annual convention of the National Concrete Burial Vault Association this year instead of a customary two-day gathering, according to J. R. Van Meter, chairman of the program and exhibits committee. The Netherland Plaza Hotel at Cincinnati will be the scene of the gathering. The dates are May 7 to 9.

Four Conventions for Concrete Industries

February, 1940, will be a big month for the concrete industries.

The twentieth annual convention of the National Concrete Masonry Association will be held for a three-day period, February 12, 13 and 14, in "Washington, D. C., convention headquarters being the Mayflower Hotel. E. W. Dienhart of the Portland Cement Association, Chicago, who serves as assistant secretary expects to have the entire program completed shortly. There will be no machinery exhibit in connection with the gathering this year. On the same dates and at the same place, the Cast Stone Institute will hold its annual meeting. C. G. Walker, assistant secretary, is arranging the program.

The Palmer House, Chicago, will attract the nation's concrete-pipe manufacturers on February 15, 16, 17 when the American Concrete Pipe Association holds its thirty-third annual convention. Details of the program are being arranged by "Mike" Loving, secretary.

The thirty-sixth annual convention of the American Concrete Institute will also be held in Chicago, on February 27, 28, and 29, with the Palmer House again serving as convention headquarters. Harvey Whipple, 7400 Second Boulevard, Detroit, is secretary.

The earliest gathering of the year, however, will be held at St. Louis January 17, 18 and 19 when the National Ready Mixed Concrete Association holds its annual meeting in conjunction with the 1940 convention of the National Sand & Gravel Association.

COMMERCIAL
CORED Steel
PALLETS
Cored pallets mean better curing and quicker curing, which cuts costs, and, because more blocks can be put on the rack or car, kiln capacity is increased.
They are cheaper to clean and oil. With cast iron cored pallets, rust is not a factor.
There is no alleged monopoly in the manufacture of cored pallet machines. Competition on this type of machine provides price protection for buyers.
THE COMMERCIAL SHEARING AND STAMPING CO.
YOUNGSTOWN, OHIO

Drops Contracting to Devote Entire Time to Concrete-Units Business

THE operations of Linton Concrete Products at Tonawanda, N. Y., offer a good illustration of the manner in which improved methods are developed in the concrete-products and other industries. A brief summary of the company's history will help to illustrate this point. In 1914 J. J. Linton and his son S. J. Linton went into the contracting business as J. J. Linton & Son and made concrete blocks as a sideline. After losing his father in 1925 S. J. Linton ran the business under his own name, but later adopted the present firm name. During all these years the concrete-block business became of more and more importance until, on June 4, 1939, contracting was dropped. The home-building activity in this rapidly-growing suburb, 10 miles north of Buffalo, now makes it necessary for Mr. Linton to devote all his time to concrete-products manufacture.

The sand, cinders and ⅜-inch gravel used in making the company's products are received in trucks. The cinders are of good quality and are hand-screened before being dumped into the plant hopper. A bucket-elevator feeds these aggregates into the three compartments of a 24-cubic yard bin. Aggregates are discharged from this bin into a stationary weighing batcher with a Buffalo 3-beam scale, from which they are in turn discharged into the Stearns 18-cubic foot open-type mixer. Sacked cement is unloaded from trucks on an endless conveyor which carries it to the mixer floor. Cement is dumped from sacks into the mixer. Concrete is discharged from the mixer through

S. J. Linton standing in front of the office

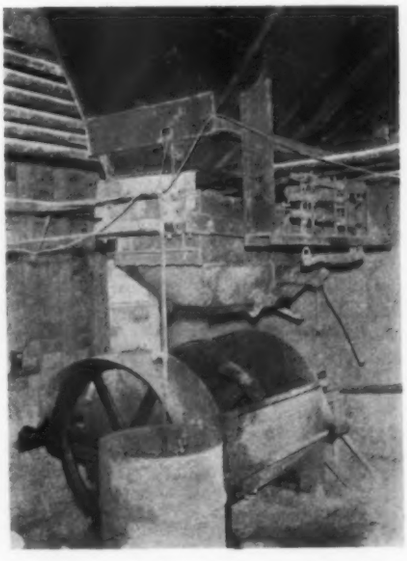
a selective split chute to either of the two block machines.

In the early days of the company's existence hand-tamp block machines were used. Mechanical tampers were added later. In 1930 the present plant structure was built, and tamper and face-down and regular stripper block machines were installed. In 1936 this equipment was replaced with three single-block Multiplex Junior power press strippers. In 1939 a Multiplex Super Tamper with Trowel Texture attachment was installed, replacing two of the strippers. All of the presses also had this attachment, but it was not as well suited to this type of machine. The one press retained has no troweling device and is used to manufacture rock-face block only.

The new machine is an 8-bar tamper built by the Multiplex Concrete Machinery Company and the troweling device attached to it was developed by that company. This oscillating texture-troweling device consists of an automatic cam-controlled mechanism which imparts to the face plate of the mold a back-and-forth troweling motion. The oscillating action begins automatically after all the concrete mixture has been tamped into the mold box and continues as the block is raised out of the mold, stopping automatically as the block is ejected. The mold is made in such a way that it saves the abrasive wearing of the troweling plates and the cam is so arranged that, after the takeoff is brought over to take the block off the machine, it automatically keeps the troweling device in motion until the block is stripped and taken off.

The use of the troweling device is said to give the block a denser and more water-resistant surface and greater strength and makes possible the use of coarser aggregates. It waterproofs the outside surface of the block, leaving the inner surface open for nailability and acoustical value. Blocks produced on the older machine tested 850 pounds per square inch. The standard blocks produced by this new machine with same aggregate, cement and water proportions test from 1,400 to 1,600 pounds per square inch. About 800 pounds of aggregates is used per sack of cement and the finished blocks weigh 50 pounds each. Some blocks have been made to special order with 1,000 pounds of aggregates to a sack of cement and these tested 1,000 pounds per square inch.

A view of the plant structure and storage yard.



Aggregate-weighing batcher over the mixer.

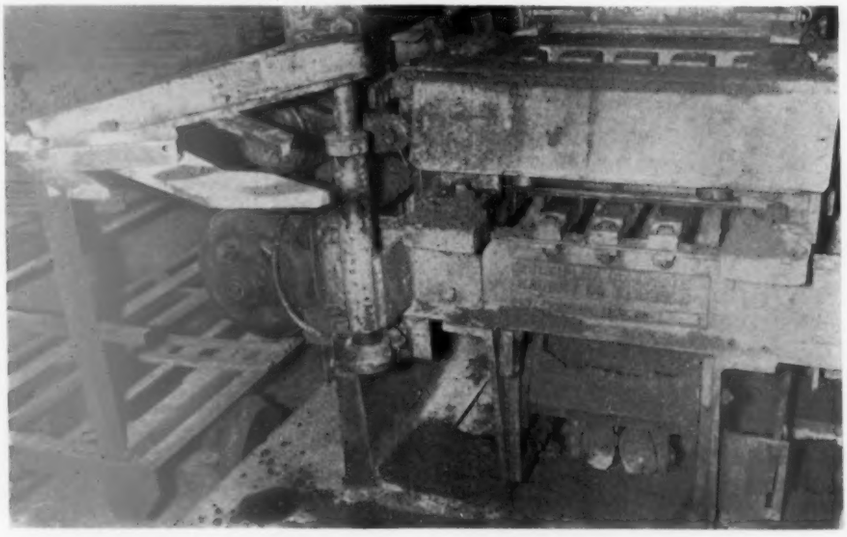
Block machine with face-oscillating mechanism at lower left.

Press stripper used for making rock-faced blocks.

No sand is used in the cinder blocks. These weigh 30 pounds each and average strengths of 850 pounds per square inch are obtained using 450 to 500 pounds of aggregates per sack of cement. These blocks are nailable and are used mainly for back-up work.

The mold box is adjustable for all sizes of units from 3 to 12 inches wall width and any desired length. The liners are attached and enclosed in ball bearing rollers which move back and forth in a specially-arranged crack. Production is limited to 4-, 6-, 8-, 10-, and 12-inch blocks. No specials are made. The new machine has a capacity of 4 to 6 blocks per minute and the two machines together can make more than 500,000 blocks annually.

The finished blocks are loaded on racks on cars which hold fifty-two 8-inch blocks each. They are moved into kilns with a combined capacity of 60 cars. After steaming and spraying for 24 hours the blocks are moved to outdoor storage. Shipments are made by truck within a radius of 20 miles, which includes Buffalo and most of the surrounding suburban area. Steam for curing is supplied by a 13-horse power vertical boiler with a Scott-Newcomb oil-burning unit. This is operated only during the night except in cold weather when steam is kept on 24 hours daily.



Close-up view of the oscillating mechanism which trowels one face of the block.

17,000 Miles of Roads Built Under Program

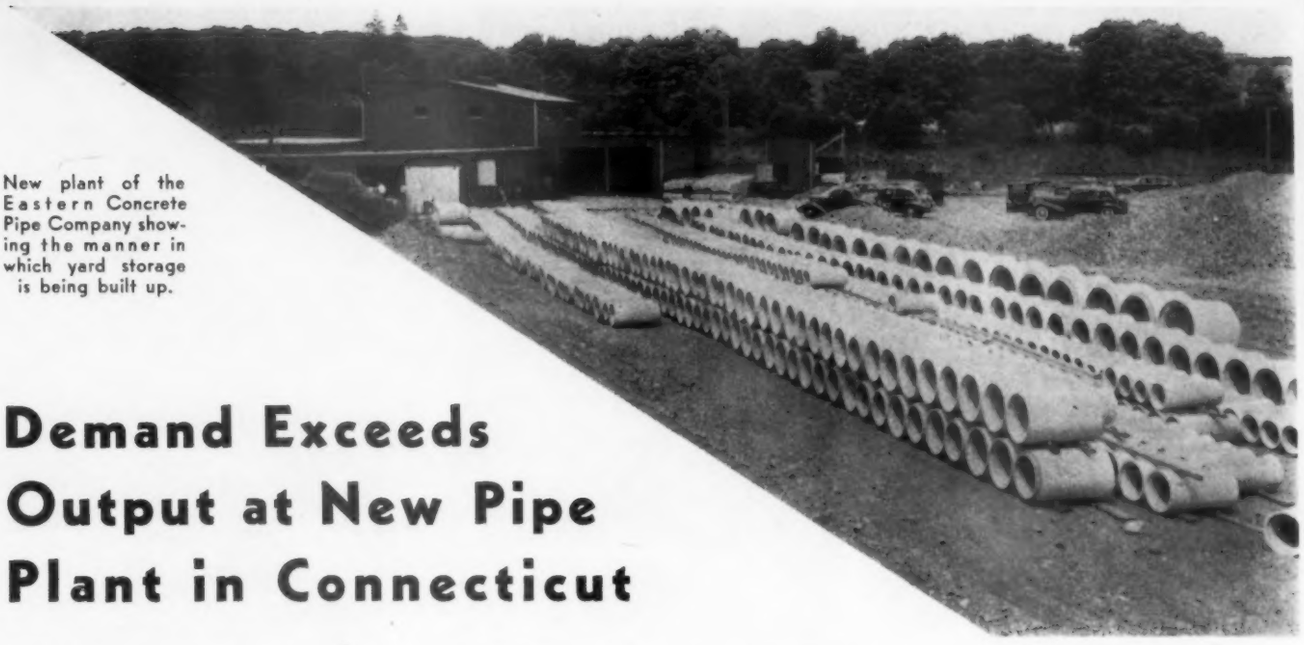
More than 17,000 miles of highway were improved during the past fiscal year in the program administered by the Bureau of Public Roads of the U. S. Department of Agriculture, according to the annual report of that Bureau which is now the Public Roads Administration of the Federal Works Agency.

Accomplishments of the year included the elimination of 382 railroad-highway grade crossings, reconstruction of 86 obsolete grade-crossing structures, and protection of 438 crossings with signals and other devices.

New Jersey's Highway Budget $11,800,000

Highway funds totaling $11,800,000 are being requested by the New Jersey State Highway Commission for 1940, according to a report by E. Donald Sterner. He estimated next year's revenues at $46,000,000.

The $11,800,000 budget does not include the cost of new roads.



New plant of the Eastern Concrete Pipe Company showing the manner in which yard storage is being built up.

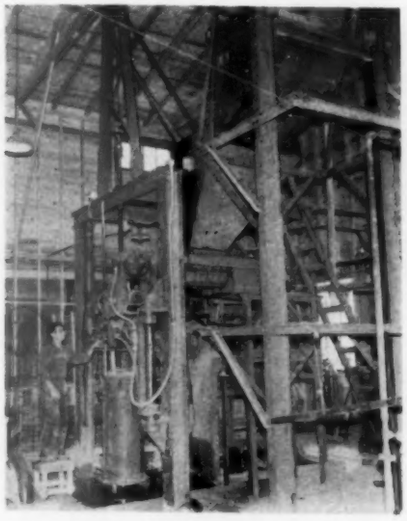
Demand Exceeds Output at New Pipe Plant in Connecticut

ONE of the latest additions to an already large but nevertheless rapidly growing industry is the new concrete-pipe plant of the Eastern Concrete Pipe Corporation at Hamden, Connecticut. This plant was completed June 19, 1939, and is located on the property of the New Haven Railroad adjacent to the sand and gravel plant of the Elm City Construction Company, from which sand is obtained. Crushed stone is obtained from a quarry operated by the Clark-Barone Company, road contractor. Joe Barone, president of the pipe company, is a member of this firm. William Smith, secretary of the pipe company, also owns the Eastern Construction Company, building contractor. George Smith, treasurer and general manager, is also a contractor.

Aggregates are dumped from trucks to piles from which they are loaded into Jackson all-welded steel wheelbarrows with Firestone pneumatic tires for discharge into a 1-cubic yard mixer with its top set flush with the concrete floor. A skip feeds the concrete to the hopper of the Universal Concrete Pipe Machine Company all-purpose pipe machine, which is now equipped to make 6-inch to 48-inch bell-and-spigot and tongue-and-groove pipes. With a few minor changes this machine can also be used for pipe up to 60 inches. A set of Universal forms has also been purchased to make pipe up to 72 inches with an external vibrator. This machine has a 2-unit tamping system with one tamper in the main frame of the machine and one on an auxiliary side arm. Each tamper operates at a speed of 650 strokes per minute and is driven by a 5-horsepower Westinghouse motor through V-belts. The 48-inch diameter revolving base has outriggers for larger sizes of pipe and is driven by a 20-horsepower Westinghouse motor through a Dodge heavy-duty clutch, and 3-speed drive. The core, which gives a smooth finish to the inside of the pipes, is operated by a Shepard-Niles self-contained hoist with Dodge roller bearings and a 10-horsepower Robbins & Myers motor. The semi-dry concrete mixture is fed into the mold by a feeder which has cast-steel paddles and is driven by a gear-motor. Steel pallets are used for pipes over 30 inches in diameter and cast-iron pallets for smaller sizes. This machine has been making an average of 600 feet of 15- to 24-inch pipe in 8 hours, all in 4-foot lengths.

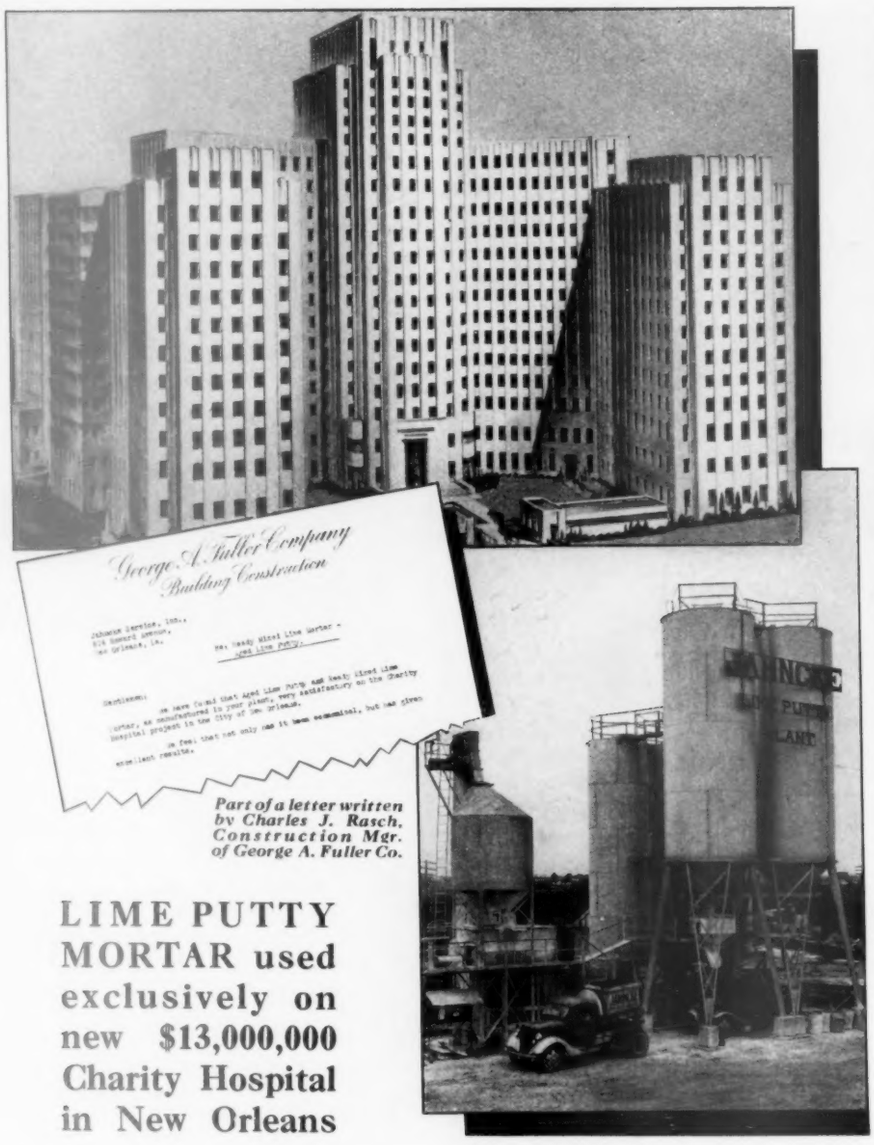
Two Universal forms are used for each size of pipe and one is emptied while the other is on the machine. Two-wheeled rubber-tired carts are used to haul the pipes to the two curing

Pipe form being put in place on machine.



View of pipe machine and charging skip.

Spot-welding the reinforcing cages.



Part of a letter written by Charles J. Rasch, Construction Mgr. of George A. Fuller Co.

LIME PUTTY MORTAR used exclusively on new $13,000,000 Charity Hospital in New Orleans

Brooks-Taylor lime putty plant operators are getting the big mortar jobs. In New Orleans, Jahncke Service, Inc. supplied all of the brick mortar for the new $13,000,000 Charity Hospital and every load of it was made from aged lime putty produced in the plant shown above at the right.

Furthermore, aged lime putty not only gets the jobs, but the contractors like it. If you don't think so read what Charles J. Rasch, Construction Manager of George A. Fuller Company has to say in a letter dated Feb. 13th, 1939, a part of which is reproduced above. He says, in part, that "not only has it been economical, but has given excellent results."

Brooks-Taylor plants provide an economical means of producing and handling aged lime putty. They are built in standard units, the capacity of which can be increased by simply installing additional ageing tanks.

When mixer trucks are used to deliver mortar, the ageing tanks are built with high legs and discharge the putty directly into the trucks, while low leg tanks and central mixing units are installed for dump truck deliveries.

Write Brooks-Taylor Co., Birmingham, Ala. or our nearest office for details.

CHICAGO BRIDGE & IRON COMPANY

Chicago	2451 Old Colony Bldg.	Tulsa	1648 Hunt Bldg.
New York	3389—165 Broadway Bldg.	Birmingham	1503 North Fiftieth St.
Cleveland	2264 Rockefeller Bldg.	Dallas	1486 Liberty Bank Bldg.
Philadelphia	1645—1700 Walnut St. Bldg.	Detroit	1552 Lafayette Bldg.
Boston	1550 Consolidated Gas Bldg.	San Francisco	1092 Rialto Bldg.
Houston	2919 Main Street	Los Angeles	1457 Wm. Fox Bldg.

B-696 Plants at BIRMINGHAM, CHICAGO, and GREENVILLE, PA.

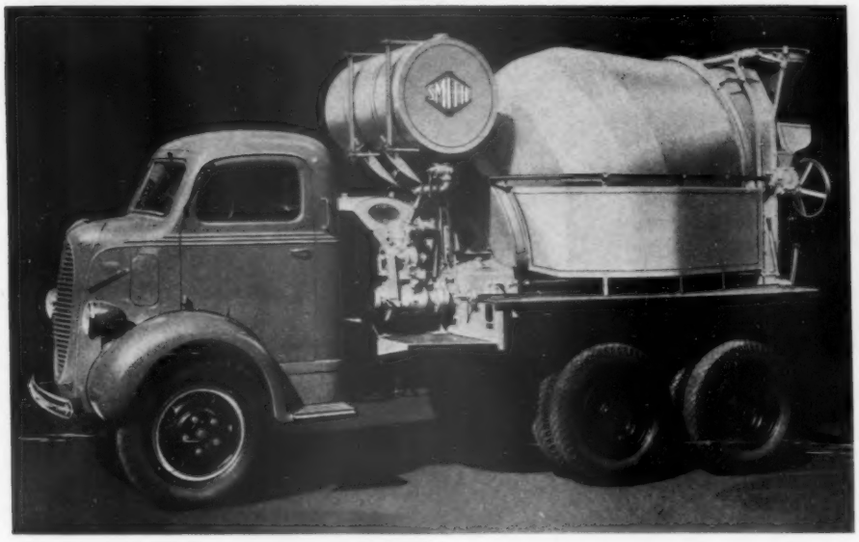
rooms, which are now being enlarged to an area 40 feet by 90 feet. Mist-type sprays are used to cure the pipes indoors for 72 hours before they are moved to outdoor storage. They are then covered with burlap and soaked for 3 more days. After a total of 14 days they are ready to be shipped. Outdoor storage space consists of 4 acres of ground which has been filled and rolled level. Pipes can be rolled from storage on trucks on a lower level or on railroad cars on a 500-foot siding. It is planned to build up a storage of at least 20,000 feet, as the demand during the past season has already been greater than the plant's capacity. The output goes mainly to contractors for highway work and to the highway department and W.P.A. The truck fleet at present consists of a Chevrolet and a 10-ton Mack, but these are to be supplemented by a fleet of 10-wheel flat body truck-trailers.

Barrowload of aggregates being dumped into the mixer.

The cement used is received by railway in sacks and is stored in a small warehouse. Steel wire for reinforcing is purchased from the Pittsburgh Steel Company and is also received by railway and stored. Two hand-operated rolls, one large and one small, are used for forming the cages, which are welded by means of a Thomson-Gibb 220-volt "spot" welder with 5-stage control.

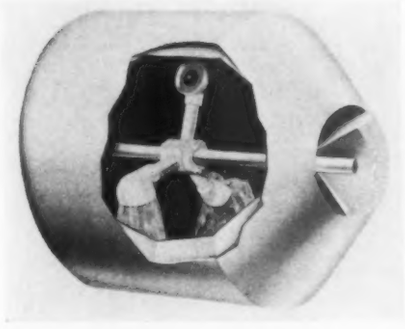
Some difficulty was encountered in getting power to this plant, although it is in a fairly well settled area. The company had to put in its own 3,000 ft. power line and poles and also had to buy property for a cross-over from the power company's lines. Control of the plant is centered in a Turnbull switch-box with 14 separate plugs which can be taken out and reversed when working on any machinery.

EQUIPMENT DEVELOPMENTS OF 1939



ABOVE—The 1940 Smith-Mobile is available in larger sizes, up to 5 cubic yards. Instead of the conventional loading hatch, this truck-mixer is equipped with a large feed chute located at the high end of the drum, making spotting easy. An unusually high discharge eliminates the need for ramps when the drum is unloaded at the job. (T. L. Smith, Company, Milwaukee.)

Clean-cut, sharp-edged units are produced with this hand-operated machine. Long levers exert powerful pressure on the block being produced. Known as "mortarless" blocks, the units have tongues and grooves and the wall is made rigid and quake-resistant by pouring concrete into the cavities which are further reinforced with steel rods. (Mortarless Tile Machine Company, Los Angeles.)



Cut-away view of a new style water impeller for Blaw-Knox Trukmixers. Attached to the water line at the center of the drum, the three non-clogging outlet nozzles distribute the mixing water uniformly and speedily through the batch. (Blaw-Knox Company, Pittsburgh.)

BELOW—The Vibr-rite concrete-block machine is said to produce dense, clean-cut, uniform blocks of even texture having the same molecular structure throughout the entire unit. It will handle any type of aggregate and produce the full line of block required in any modern plant, including header blocks, fractional blocks, bricks, tiles and manhole blocks. It uses one size of pallets, either steel or wood, for all units produced. (Jackson & Church Company, Saginaw, Michigan.)

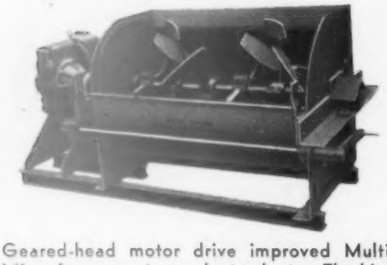
Brick attachment for all Stearns power strippers and for all Stearns Clipper strippers that have lever-operated or power-operated strike-off. The attachment consists of a mold box, tamp feet, hold-down assembly and compensating pallet support bars. It makes eight bricks on end at each operation, trowelling all four sides of each. Uniform density is assured, as there is an individual tamp rod for each brick. No matter what the character of construction, some bricks are always required and block makers welcome such a simple, low-cost attachment to augment their production facilities. (Stearns Manufacturing Company, Adrian, Michigan.)

The "Cement Hog" is a midget-sized tractor with power-operated scoop on the front, small enough to operate inside a box-car. The machine is powered by a 4-cylinder gasoline engine or electric motor. One man operating the "Cement Hog" and one laborer to clean the corners, etc., can unload a 300-barrel car of bulk cement in 1½ hours. (Butler Bin Company, Waukesha, Wisconsin.)

This latest type Jaeger truck-mixer is driven direct from the truck engine through a shock-proof transmission operated by vacuum control on the steering post. Any standard type of power take-off may be used. Separate engine drive is also available. Vacuum operation features the multiple-disk type mixer transmission. (Jaeger Machine Company, Columbus, Ohio.)

The Kirkham vibrator, a low-cost, high-production block machine employing positive vibration. Uses one size plain pallet for all size units. Makes 1,000 blocks or 8,000 bricks in 8 hours. (Concrete Transport Mixer Company, St. Louis.)

New stream-lined truck-mixer made in the following capacities: 1½, 2½, 3½, 4, and 5 cubic yards. All mixing action is done in the barrel of the drum and not in the cones, assuring maximum-strength concrete, a clean drum when contents have been discharged, accurate control of water, fast charging, and one-man control. (Ransome Concrete Machinery Company, Dunellen, New Jersey.)



Geared-head motor drive improved Multi-Mixer for concrete-products plants. The high back allows ample room for the use of light-weight aggregates. It has a low charging and discharge height and a low power ratio. The mixture is combined and recombined ten separate times during each revolution for thorough mixing action. Shafting and paddle-arm sizes are increased as capacities of the various models increase. Renewable, three-piece liners are used and, like the paddles, are supplied in carbon steel, or special abrasion-resisting alloy. (Multiplex Concrete Machinery Company, Elmore, Ohio.)

One or two men can turn out up to 2,000 concrete drain tiles in a day in sizes to 8 inches in diameter with this machine. A reciprocating table feeds the concrete into the forms. (W. E. Dunn Manufacturing Company, Holland, Michigan.)

Portable plant for batching bulk cement which can be assembled and erected in four hours' time. The standard model is equipped with a 16-cubic foot batcher. Larger sizes are also available. (Heltzel Steel Form & Iron Company, Warren, Ohio.)

1939 in Review

Ready-Mixed Concrete

THE ready-mixed-concrete industry during 1939 continued its phenomenal growth of the past few years and again set a new "high" in both actual output and productive capacity. Dozens of new producers entered the field and many established producers enlarged existing plants or built additional plants. Truck-mixers and agitators were purchased by the hundreds, one producer alone buying more than fifty units.

The industry not only went along with the upward swing of construction volume, it also made further gains by supplying a larger percentage of all the concrete poured than ever before. More and more contractors and other buyers are realizing, and taking advantage of, the benefits offered by this product, the market for which seems still to be far from its saturation point. Job mixers which managed to survive the depression are falling by the wayside and, in many instances, are not being replaced.

There were no startling developments during the year in this industry other than its growth. Most of the new operations appeared in the smaller cities and are of the central-batching type. As in other recent years, the central-mixing plants built are in the larger cities, where most of the demand is in a comparatively small area. In some sections plant mixers are used for shrink-mixing in order to get the maximum capacity out of truck-mixers.

The San Francisco Bay Region, which already boasted some of the most pretentious plants in the industry, contributed a number of outstanding new plants. Pacific Coast Aggregates, Inc. took the lead with two new central-mixing plants, one in San Francisco and the other in Daly City, one of its suburbs. This company late in 1938 took over the Golden Gate-Atlas Materials Company, its batching plant and truck-mixer fleet, in which it formerly had only a part interest. At that time it also acquired Transit Concrete, Ltd., an Oakland subsidiary formed in 1931.

The San Francisco plant, located at 16th and Harrison Streets, was built at a reported cost of $100,000. The old Golden Gate-Atlas dry-batching plant on this property is retained for this purpose and for aggregate storage for the new concrete plant. Aggregates are carried on a conveyor to this plant, where revolving spouts distribute them into two 260-ton 4-compartment bins. Fine sand for blending goes to a separate 100-ton bin.

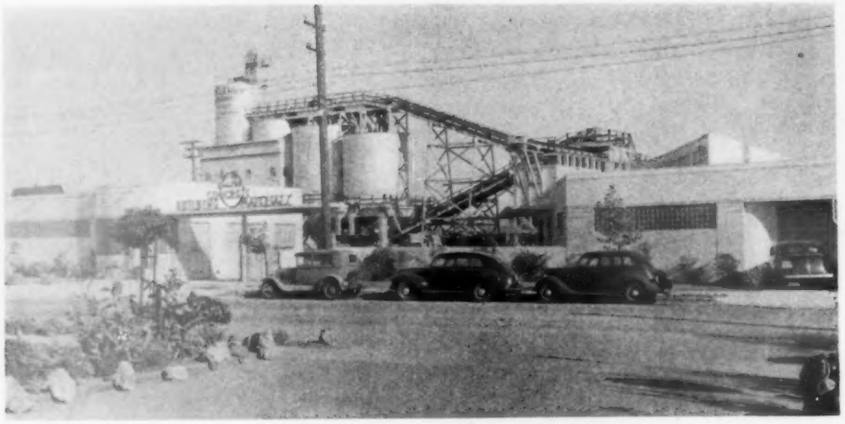
Cement is unloaded from cars by a Fuller-Kinyon portable unloader into two 2,000-barrel 2-compartment steel tanks which are vented through a Fuller Airveyor tank.

These duplicate storage systems serve two 2-cubic yard Noble automatic batchers used for measuring out both aggregates and cement. Cement is fed to the batchers through sloping feed screws, and aggregates are discharged into them through gates. Separate belt-conveyor feeders supply blending sand to both batchers as needed. Water is measured in Ransome tanks. Each of the two 2-cubic yard Davis mixers discharges alternately into two 6-cubic yard movable hoppers from which the truck-mixers are loaded. As the concrete is given only a 30-second shrink mix, this makes possible continuous loading of the truck-mixers at the rate of 150 cubic yards per hour. Four truck-mixers can be loaded at one time.

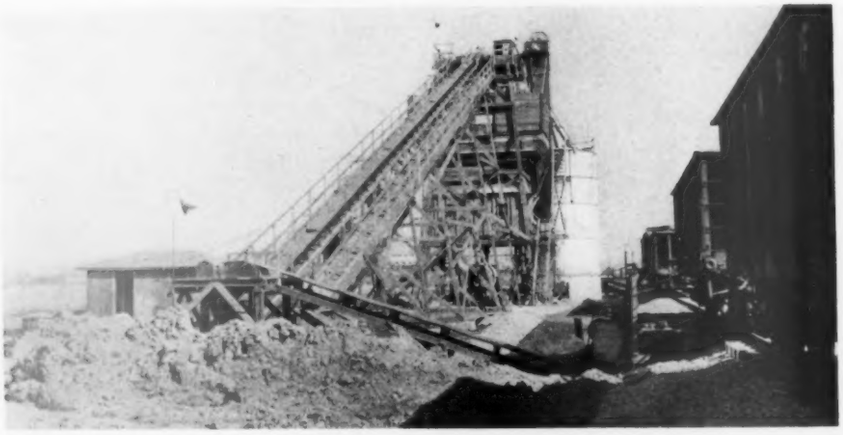
The Daly City plant was built to

The new central-mixing plant of Pacific Coast Aggregates, Inc., at Daly City, California, with its modern exterior.

The new San Francisco central-mixing plant of Pacific Coast Aggregates, Inc. The old batching plant in background is used for aggregates storage.



The batching plant of the Henry J. Kaiser Company at Oakland, California, showing the new aggregate-storage bins and the modern office, warehouse and garage buildings.



The new Alameda plant of the Henry J. Kaiser Company which is supplying concrete for construction of the new Alameda Naval Air Station.

serve a rapidly growing suburban section south of San Francisco and presents an unusually attractive appearance because of the modernistic building in which it is housed. This plant has a capacity of 50 cubic yards per hour when shrink-mixing. Its equipment includes a Redler cement conveyor, a Bodinson weigh-batcher with photo-ëlectric-cell control of cement and manual control of the aggregate feed. A 2-cubic yard Davis mixer is used.

Few changes have been made in recent years to the Oakland plant which was built in 1927 and has a rated capacity of 200 cubic yards per hour. This remains one of the largest commercial plants in existence. The company operates a fleet of 35 truck-mixers of various makes including Blaw-Knox, Chain Belt and Jaeger. A few old Paris Transit mixers are still in use. Ten new Smith-Mobile truck-mixers have been ordered, of which a few are now in use, and some of the older mixers will be retired.

The Henry J. Kaiser Company, Oakland, California, in 1939 built a new plant in Alameda to supply over 100,000 cubic yards of concrete for the new Alameda Naval Air Station. This is exclusive of the paving which will be done later and may double that amount. This plant is temporary but is in every way a modern, efficient operation. A closed circuit connects the three 70-barrel cement bins over the batcher and the main 3-compartment, 1,500-barrel storage silo. The equipment includes a Johnson 4-cubic yard weigh-batcher

The new batching plant of the Consumers Supply Company, Louisville, Kentucky.

with an internal cement compartment. This plant has a capacity of 100 cubic yards per hour operating on a 2-minute batching cycle.

This company also operates in Oakland a wholesale batching plant from which building-material dealers distribute concrete in their own trucks. This plant was completed in 1938, but additional aggregate storage bins have since been added. A new and very attractive office and garage building has also been erected.

A number of new producers also entered into the intensive competition which exists in the Los Angeles area. One of these, the Blue Diamond Corporation, Ltd., has been a producer of sand and gravel, gypsum, lime and cement for many years. A fleet of six new truck-mixers was put in operation by this company.

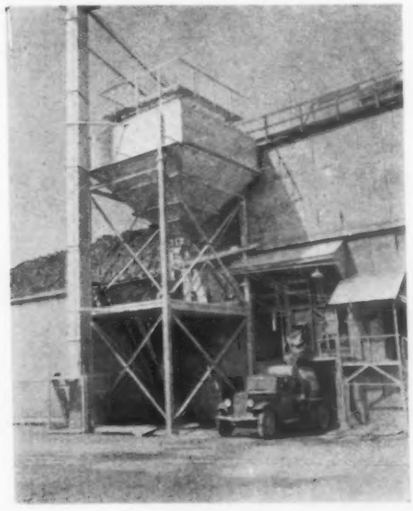
A compact batching plant was built by the S. H. Bacon Materials Company, which has been a dealer in building materials for six years. Starting out with three Blaw-Knox 3½-cubic yard trukmixers, two 4-cubic yard mixers of the same make were recently added. Aggregates are raised by an elevator into a 260-ton 4-compartment

The new batching plant of the W. D. Haden Company, Houston, Texas.

bin. Cement in sacks is loaded from the warehouse into a flat-skip car which operates on an inclined track leading to the batching floor. A 2-cubic yard aggregate weighing batcher is used.

Another city in which there was great activity in the ready-mixed-concrete industry is Houston, Texas. The outstanding development was the new yard of Parker Brothers & Company, Inc., a long-established producer of sand and gravel, oyster shell and ready-mixed concrete. This yard is located on the Houston Ship Channel, a deep waterway which connects that city with the Gulf of Mexico. Shell is received

in barges and is unloaded to stock-piles from which it is reclaimed by a tunnel conveyor. Sand and gravel are received by railway and are conveyed either to a stock-pile or to the bins of a modern concrete central-mixing plant. On the property also are a modern aggregate-bituminizing plant and a screening plant. The company's main and yard offices are now located in a new 2-story building of modern design. The entire plant is built of concrete and steel and is painted aluminum color. As the yard is on the main highway leading east out of Houston the attractive appearance of the yard and buildings is a good advertisement for the company's products.



The bulk-cement handling, storage and batching system of the Central Pre-Mix Concrete Corporation.

The W. D. Haden Company, one of Houston's pioneer sand-and-gravel, shell, lime and ready-mixed-concrete producers, built a new plant in the southwestern part of the city to serve a rapidly-growing residential district. Briefly, this plant consists of a 2-compartment 500-barrel cement bin, a 175-cubic yard aggregate bin, a 2-cubic yard aggregate batcher, and a 2,000-pound cement batcher. both with Fairbanks dial scales. The company now operates a fleet of 22 mixer trucks. Another new plant was built by this company in 1938.

The Loizeaux Builders Supply Company, Elizabeth, New Jersey, a producer of ready-mixed concrete since 1928, built a new batching plant at a central location. The Blaw-Knox Company supplied all the equipment, including a 400-ton, 4-compartment aggregate bin, a 1,200-barrel, 4-compartment cement bin, a 5-cubic yard aggregate batcher and a 50-cubic foot cement batcher. At the same time three new Blaw-Knox trukmixers were added making a total of ten in the fleet. A

The new batching plant of the Ready-Mix Concrete Company, Bloomington, Indiana, a subsidiary of the Bloomington Crushed Stone Company.

New batching plant of the Transit-Mix Concrete Company, Owensboro, Kentucky. Cleated belt-conveyor for sacked cement at right.

Surplus concrete brought back in truck-mixers at the Transit-Mix plant is used to make concrete foundation posts.

feature of the plant is the use of Bin-Dicators on the cement bins which warn the car unloader when the bins are full.

The Central Pre-Mix Concrete Company, Spokane, Washington, installed facilities for using bulk cement. The cement is carried from a track hopper by a screw-conveyor and elevator to a 600-barrel, 2-compartment bin. Two rotary gates feed an inclined screw-conveyor which feeds the batcher in the original plant. This company added 2 Chain Belt Rex truck-mixers to its fleet, making a total of 8.

The Southern Materials Corporation, Norfolk, Virginia, late in 1938 began extensive sand-and-gravel and ready-mixed-concrete operations with that city as a base. Concrete batching plants were erected at Portsmouth, Norfolk and Richmond. In 1939 a fourth plant was opened at Sewell's Point, near Norfolk, to supply concrete for work at the Naval Base. Chain Belt Rex 1½- and 2½-cubic yard truck-mixers on Brockway trucks are used, and the fleet now consists of 24 mixers, most of them purchased in 1939.

The Norfolk plant was improved by the installation of a Blaw-Knox bulk-cement handling plant. A new Northwest crane was purchased for the Richmond plant. This is powered by a Murphy Diesel engine and has a 1-cubic yard Blaw-Knox clam-shell bucket.

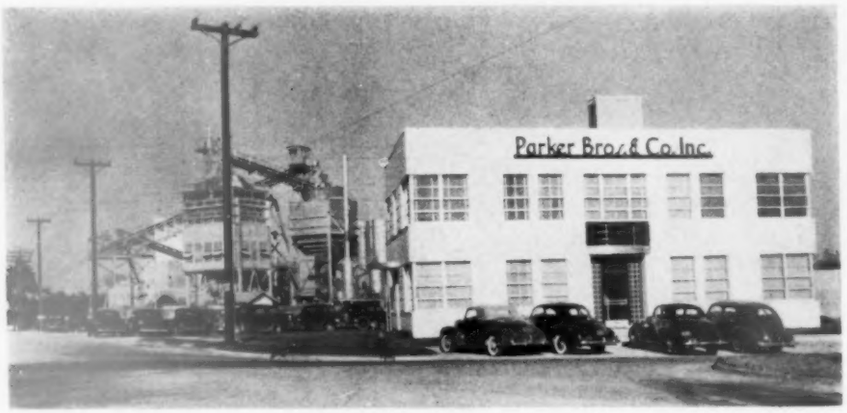
The Consumers Supply Company, Louisville, Kentucky, went into the business with a Blaw-Knox batching plant and a fleet of 2½-cubic yard Blaw-Knox Trukmixers. Elevators are used to discharge the cement and aggregates into bins. A single 2½-cubic yard batcher is used and water is measured in a 125-gallon automatic tank (*P&Q*, November, 1939, p. 6).

Another new producer is the Transit-Mix Concrete Company, Owensboro, Kentucky, which also erected a Blaw-Knox batching plant. Three 1½-cubic yard Blaw-Knox Trukmixers are used. An interesting feature is the use of surplus concrete to make concrete-footing units for buildings. A new venture is the casting of concrete slabs on the job for erecting small residences by the "tilt-up" method. Experiments are being conducted in co-operation with the Portland Cement Association (*P&Q*, December, 1939, p. 72).

In this same area a plant was built at New Albany, Indiana, by New Albany Ready Mix Concrete, Inc. at a reported cost of $50,000. Later this plant was taken over by W. R. Sosthe'm.

The Central States Construction Company, La Crosse, Wisconsin, built a new batching plant and purchased 4 Chain Belt Rex truck-mixers.

The Concrete Ready Mixed Company, Lafayette, Indiana, built a new batching plant and bought 2 Chain Belt Rex truck-mixers.



The new yard and office of Parker Bros. & Company, Inc., Houston, Texas. At left is the new central-mixing plant.

The portable batching-and-mixing plant used by Charles B. Johnson & Son to build a school in Rockford, Illinois.

The new batching plant of the S. H. Bacon Materials Company, Los Angeles.

The National Lime & Stone Company built a new plant on its crushed-stone plant property at Findlay, Ohio.

The Basalt Rock Company, which has for some years been producing ready-mixed concrete at Napa, and San Francisco, California, built a new plant at Flosden, near Vallejo in that state. This plant, which has a capacity of 700 cubic yards daily, was built primarily to supply concrete for construction work going on at the Mare Island Navy Yard.

Ray Sablain, Lansing, Michigan, bought Butler bins and batchers and three new truck-mixers.

A new plant was built by the Ready-Mix Concrete Company, Bloomington, Indiana, a subsidiary of the Bloomington Crushed Stone Company. It consists of four 70-ton Blaw-Knox bins, Link-Belt feeders and elevators, and a combination cement and aggregate batcher. The fleet consists of 5 Blaw-

Knox 1½-cubic yard truck-mixers on Ford trucks.

An interesting addition to the equipment used for producing concrete is the Erie Steel Construction Company Strayer portable concrete plant. A number of these plants are now in use by contractors and ready-mixed-concrete producers. Charles B. Johnson & Son,

The lime-putty plant of Jahncke Service, Inc., New Orleans, showing the 3 new tanks.

Inc., general contractors of Chicago, Illinois, used one of these plants in the construction of a high school in Rockford, Illinois, which required 11,000 cubic yards of concrete. The plant consists of a ramp from which trucks discharge aggregates into a hopper whence an elevator feeds a bin. Aggregates are weighed in a batcher and, with water and cement from sacks, are dumped into a concrete mixer. All this equipment is mounted on a frame supported on two axles, each fitted with dual pneumatic-tired wheels.

One of the five 2-cubic yard truck-mixers purchased by C. S. Barlow & Sons, Inc.

Many producers of ready-mixed concrete added to their fleets during the year. Some of these are listed below. The Fountain Sand & Gravel Company, Fountain, Colorado, a producer of 11 years' standing, purchased 1½-cubic yard Smith-Mobile mixers mounted on Ford cab-over-engine trucks.

The Springfield Quarry & Concrete Company, Springfield, Missouri, bought three Concrete Transport Mixer Company truck-mixers.

Some of the new truck-mixers purchased by Otto Ladwig & Sons, pioneer ready-mixed concrete and aggregate producers of Milwaukee.

The new batching plant of the Loizeaux Builders' Supply Company, Elizabeth, New Jersey. Aggregates are received by water and cement in bulk cars.

The West Virginia Sand & Gravel Company, Charleston, West Virginia, added 3 Chain Belt truck-mixers of 4-cubic yard capacity mounted on International trucks.

The Jacksonville Concrete Company, Jacksonville, Florida, and the Contee Sand & Gravel Company, Laurel, Maryland, added Ransome truck-mixers.

Two Jaeger truck-mixers were purchased by the Bowsman Washed Sand & Gravel Company, Troy, Ohio.

The V. E. Schevenell Construction Company, Memphis, Tennessee, bought five Chain Belt truck-mixers on International trucks.

A Blaw-Knox mixer on a Ford truck was purchased by Dave Lehr, Inc., sand-and-gravel producer of San Antonio, Texas.

The Southern Builders' Supply Company, Louisville, Kentucky, added two 2½-cubic yard Blaw-Knox trukmixers.

Several Jaeger truck-mixers were purchased by the United Sand & Gravel Company, Canton, Ohio.

C. S. Barlow & Sons, Inc., Tacoma, Washington, replaced its fleet of old Paris Transit mixers with five Smith-Mobile 2-cubic yard mixers mounted on International trucks. This company is a pioneer in every sense of the word, having been founded in 1882 and having begun the production of ready-mixed concrete in 1925.

Fleets of Smith-Mobile truck-mixers were purchased by Otto Ladwig & Sons, Milwaukee, Wisconsin and the Heafey-Moore Company, Oakland, California.

There was considerable activity during the year among manufacturers of lime putty. The Colonial Sand & Stone Company, Long Island City, New York, added two more tanks to its Brooks-

The lime-putty plant of the Louisville Lime Mortar Company, showing the third kiln just added.

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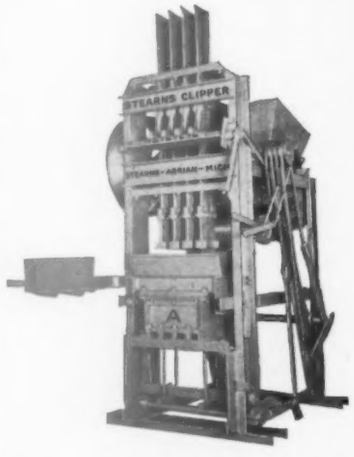

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G. M. Friel, Manager **Columbus, Ohio**

Taylor plant, giving it a putty-storage capacity of 30,000 cubic feet, probably the largest of any plant ever operated in this country.

Jahncke Service, Inc., New Orleans, Louisiana, added three tanks to its initial 2-tank Brooks-Taylor plant, making a total storage capacity of 12,000 cubic feet. A Carter pump was installed to pump the stiff putty from the aging tanks to a central-mixing plant, where the lime putty and sand are combined in a 2-cubic yard mixer for discharge into dump trucks. This arrangement makes it possible to use either dump or mixer trucks for delivering mortar.

One of the fleet of new truck-mixers added by Pacific Coast Aggregates, Inc.

The State Sand & Gravel Company, Indianapolis, Indiana, added a third tank to its Brooks-Taylor plant, doubling its capacity and giving it a storage of 7,500 cubic feet.

The Louisville Lime Mortar Company, Louisville, Kentucky, which in 1938 put in operation a 2-tank Brooks-Taylor lime-putty plant, added a third tank, which has doubled the plant's capacity. The storage capacity is now 7,500 cubic feet.

The Sheffield Brick & Lime Company, Inc., Phoenix, Arizona, completed a new lime-putty plant. Lime is slaked and aged in three 30-ton tanks.

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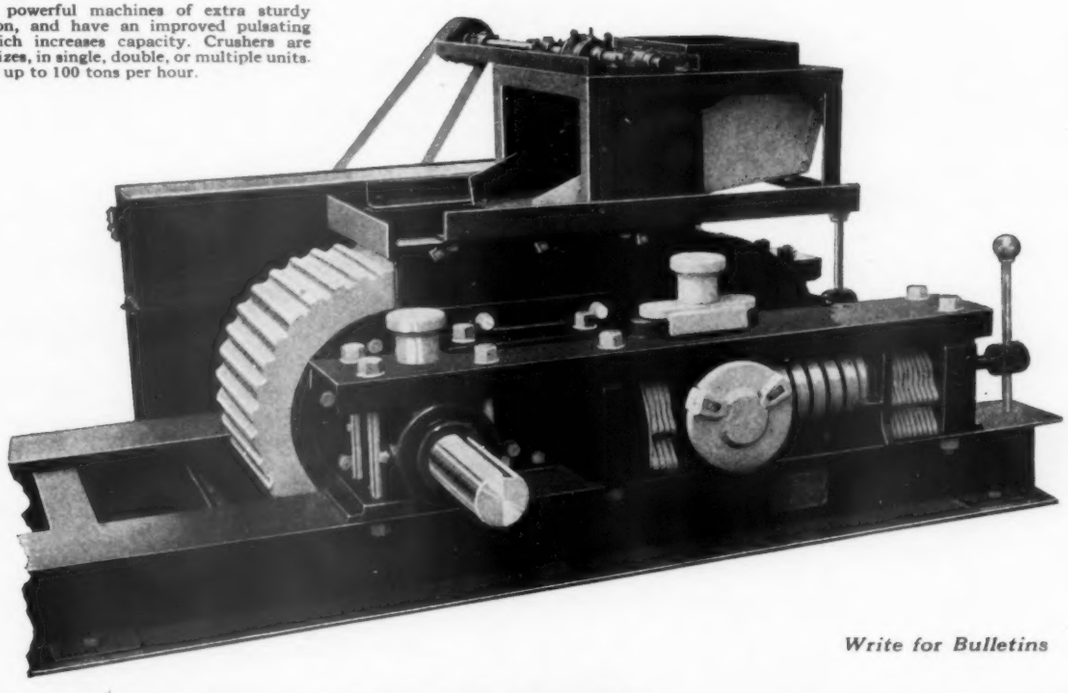

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Plan definitely to come by making your hotel reservations now! You will be amply repaid by the new knowledge you will acquire, by the valuable new contacts you will make, by the old friendships you will renew.

CONVENTION DATES

•

January 17, 18, 19—1940

Twenty-Fourth Annual Convention, National Sand and Gravel Association.

January 17, 18, 19—1940

Tenth Annual Convention, National Ready-Mixed Concrete Association.

January 22, 23, 24—1940

Twenty-Third Annual Convention, National Crushed Stone Assn.

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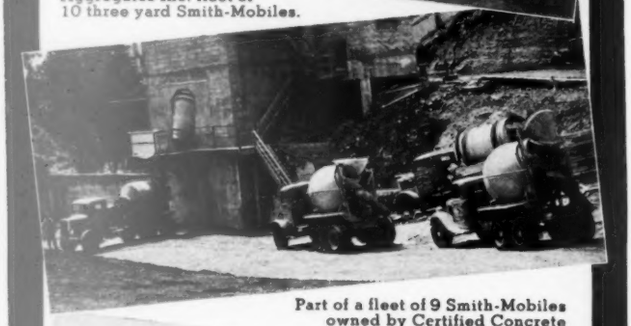

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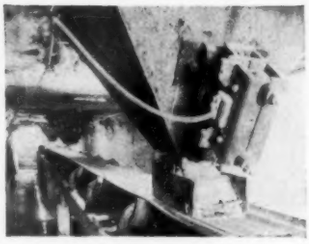

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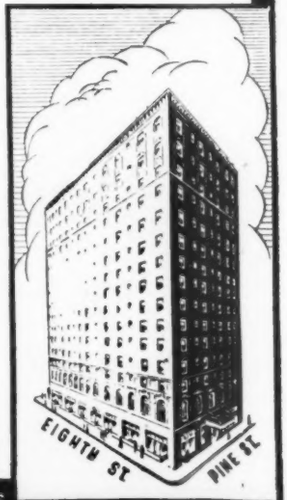

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American Builder — December, 1939

THE two-family dwelling shown at the left contains two well arranged six-room apartments, each with two baths. It was designed and built by Lanham & Co. of Milwaukee, and is located in the suburb of Shorewood.

Attractive Duplex in Concrete Brick

THIS unusual duplex was built in a Milwaukee suburb; planning and construction are the work of Lanham & Co., Milwaukee, Wis., builders.

An outstanding feature of the exterior design, as viewed above, and to the right, is the front entrance handling which segregates the two doors. The one to the first floor apartment is located off the side porch, while the one giving access to second floor stairs is placed to appear as the front entrance.

The solid masonry walls are constructed of concrete brick and block in a novel bond which gives the wall a good insulating value. This is detailed on the opposite page, and consists of 8x8 Waylite blocks white matt glazed on one face used every sixth course as a bond, with white matt glazed Dunbrik as face material and standard Waylite concrete brick as face material and these bond courses. The garage wall uses the same material laid in such a manner as to give an air space between the bond courses, with the 8x8 block set on edge on the inside.

Both of these walls from the exterior have the appearance of a regular veneer job, with no headers or bond courses in evidence; the color being part of the masonry, this appearance is permanent.

The plans provide for two six-room apartments and individual basement facilities for each. This generous accommodation is arranged within an overall dimension of 32 feet by 52 feet 4 inches; the width allows for placement on a city lot with 50 foot frontage and still gives ample space at the sides, or might even be placed on a narrower lot. The apartments are practically identical; both apartments have plenty of storage space. The one on the first floor has an extra closet, both apartments have natural wood-burning fireplaces; The living rooms have built-in cupboards flanking the connecting archway. In the kitchen, work and adjoining dining rooms have built-in cupboards flanking storage spaces, together with the equipment, are placed along two walls in an efficient L-shaped grouping. Three bedrooms for each apartment occupy the remaining portion of the plan. The full bath is placed between the larger two, while a smaller bath with shower is located so as to be handy to the rear bedroom which might be used as a maid's room. This bath, having no outside wall, is supplied with a 3½ by 6 inch vent to the roof.

The upper apartment has an airing porch off the rear bedroom and the deck over the first floor entrance porch gives a second porch area.

This project is another example of the current trend in duplex design toward more compact, livable structures which fit into the average residential community without being out of harmony with adjacent homes.

WHILE the brick exterior is laid up to look like regular veneer, the walls are actually 8" solid with a special bond as detailed on opposite page.

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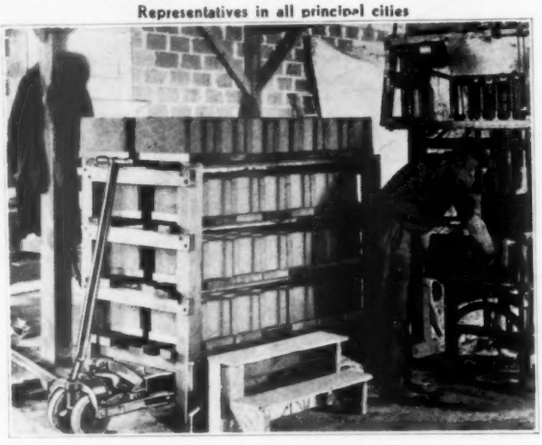

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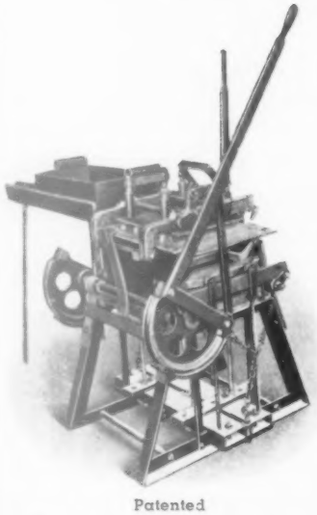

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Machines made for any size or design of block or brick desired.

High priced machines are no longer necessary or advisable

Write for Particulars

MORTARLESS TILE MACHINE COMPANY, Inc.
3328 San Fernando Road
Los Angeles, California

START A NEW BUSINESS

This shows one of our Multiple Molds for casting 8x8x16" concrete blocks. We manufacture a complete line of Multiple Molds for blocks (both Rockface and plain), for brick, veneer blocks, etc. We are also owner and originator of the ZAGELMEYER SYSTEM of granite veneer for blocks.

Make **ZAGELMEYER** *Waterproof Concrete Blocks*

A Start May Be Made With as Little as $500.00

The Zagelmeyer System produces a block that no other system can equal. Many good territories open. Write today for further information.

Zagelmeyer Cast Stone Block Machinery Co.
502 S. Henry St. BAY CITY, MICH.

HOTEL PHILADELPHIAN

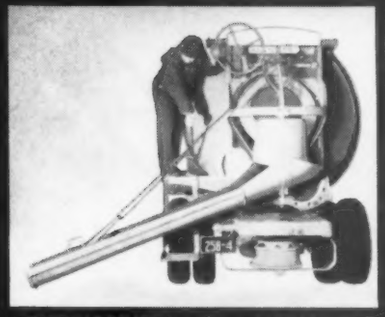
FORMERLY HOTEL PENNSYLVANIA
DANIEL CRAWFORD, JR., MANAGER
39th and CHESTNUT STREETS
PHILADELPHIA, PENNA

Our courteous and competent staff will give you the utmost in friendliness, comfort and service. Conveniently located to all stations, and only five minutes away from the heart of the business section.

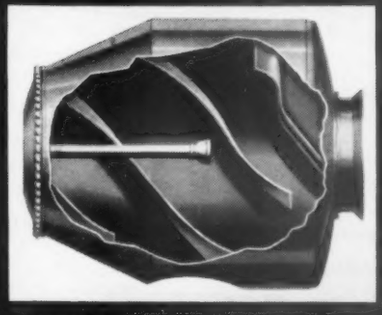
600 ROOMS each with bath from $2.50 up

Lounge and Restaurants *Unrestricted Parking to 3 A.M.*

HERE'S WHY



DISCHARGING 4 or 5 yards in 60 seconds flat, or a cubic foot at a time is easy for the operator of a Rex Moto-Mixer!



THE REX Single Cone-End Mixing Drum gives a natural, positive reversing action without the aid of "throw-back" blades.

MOTO-MIXERS ARE THE MONEY-MAKERS!

Rex Moto-Mixers are consistent money-makers for ready-mixed plant operators all over the country, for one good reason—their mechanical superiority, feature by feature.

Just take a look at the Rex Cone End Drum, the only one of its kind. Check over the Rex one-man end controls, the zipper-type chute suspension and the exclusive Rex 3-point drum suspension that stops end play before it has a chance to start.

These are features every truck-mixer owner needs for fast, low-cost, consistent money-making performance. Only Moto-Mixers offer them. That's why Moto-Mixers are the money-makers! For the lowdown on the mechanical leadership of Rex Moto-Mixers, send for the Moto-Mixer catalog. Use the coupon.

BUY

REX MOTO-MIXERS AND BE RIGHT!

CHAIN BELT COMPANY
1646 W. Bruce Street
Milwaukee, Wisconsin

Please send me my copy of the Moto-Mixer catalog for 1940.

Firm Name.....

By.....Title.....

Address.....

City.....State.....

I am or (am not) a truck mixer owner or operator. (Check which.)

In Cleveland

THE HOLLENDEN

In Cleveland's business center. 1050 rooms with bath and radio. 300-car garage in same building. Famous Vogue Room, popular-priced Coffee Shop.

In Columbus

THE NEIL HOUSE

Across from the State Capitol. 655 rooms, all with bath. New Century Room features dancing and entertainment.

In Akron

THE MAYFLOWER

One of the midwest's newest, finest hotels. In the center of downtown Akron. 450 rooms with bath and 4-station radio.

In Jamestown, N.Y.

THE JAMESTOWN

A leading hotel of western New York. 250 rooms all with bath. New Parisian Room and Cocktail Lounge.

THE SAMUELS

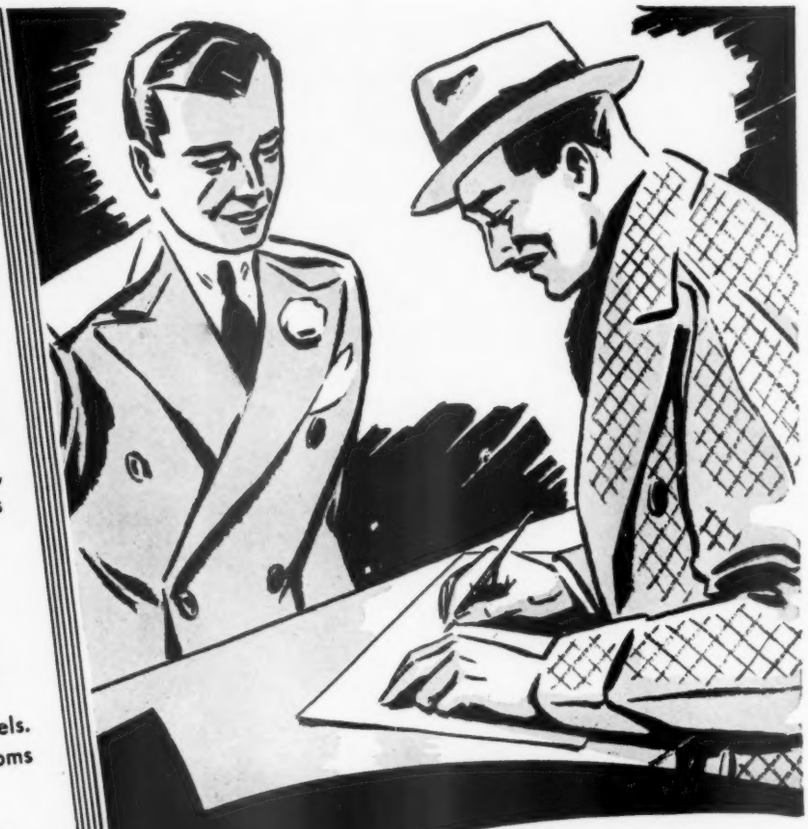
Popular-priced, modern hotel . . . 200 cheerful rooms. Air-conditioned restaurants. Garage in connection.

In Corning, N.Y.

BARON STEUBEN HOTEL

Finest hotel in Corning. 100 rooms with bath at moderate rates. Garage in connection.

DeWITT OPERATED HOTELS



Check In

AT

DeWITT OPERATED HOTELS

The Hotels That Check With Every Travel Standard!

People who travel a lot set up a rigid code of the things they expect and demand in a good hotel. Because De Witt Hotels maintain such strict standards of excellence, they have long been favored by exacting travelers.

1. Rooms are large, cheerful and spotlessly clean. Beds are sleep-inviting.
2. Rates are surprisingly low for the service rendered.
3. There are restaurants to suit every mood ... good food at a price to suit every purse. Dance music and entertainment.
4. Employees are friendly, diligently trained, always alert to serve you.

DeWITT OPERATED HOTELS

THEODORE DeWITT, President • R. F. MARSH, Vice-President

Only JAEGER Offers These Advantages--

DRIVE FROM THE TRUCK ENGINE THRU SHOCK-PROOF TRANSMISSION, VACUUM-CONTROLLED FROM CAB (or separate engine drive if desired).

DUAL-MIX DRUM produces higher strength concrete—as proved by the Hollister Tests.

THROW-BACK REVERSING BLADES—proved essential to a fast, thoro mix.

DUAL REVOLVING WATER SPRAYS spray to both ends of drum, insure faster, more uniform water distribution.

SYPHO-METER TANK insures accurate water control.

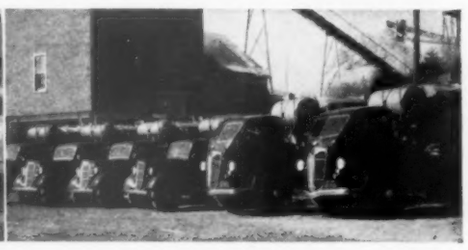
RUST AND ABRASION-RESISTING ALLOY STEEL—lighter, stronger, longer lived.

RECOGNIZED LEADERSHIP—more concrete is sold with Jaeger Truck Mixers than by any other method.

THE JAEGER MACHINE CO., Columbus, Ohio

SEND FOR YOUR COPY OF THIS 68-PAGE DATA BOOK FOR READY-MIXED PLANTS

Whether you are already operating a ready-mixed plant or planning to start one, you will find this book an invaluable guide and reference on modern truck mixer and agitator operation, compiled by the world's largest manufacturer—up-to-date, authoritative, complete.

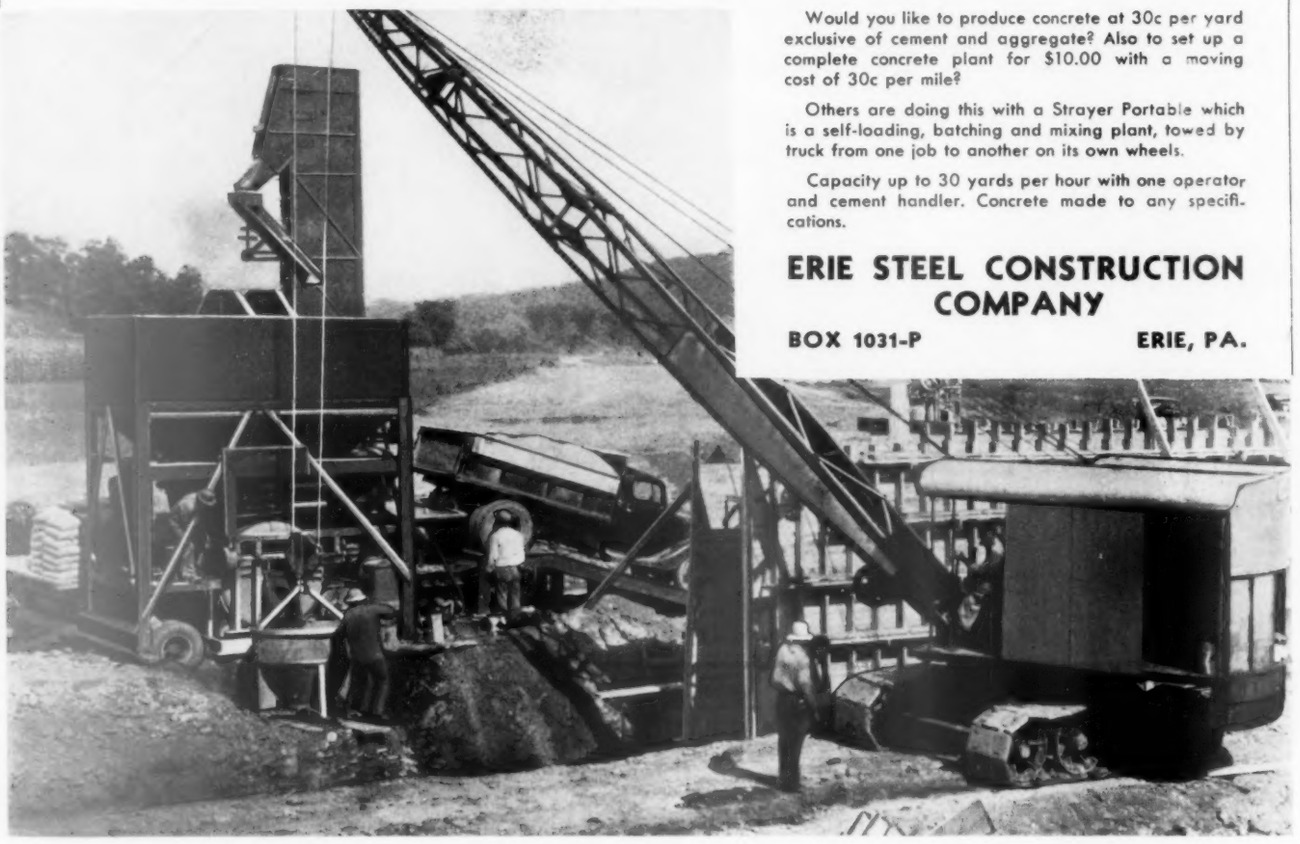


THE JAEGER MACHINE COMPANY
602 Dublin Avenue, Columbus, Ohio
Gentlemen:
We are interested in 1940 data on Ready Mixed Plants with Truck Mixers and Agitators, including set-up, operation, maintenance costs, selling of strength concrete, etc., as well as new developments in mixer design.

Name .....

Address .....

STRAYER PORTABLE CONCRETE PLANT



Would you like to produce concrete at 30c per yard exclusive of cement and aggregate? Also to set up a complete concrete plant for $10.00 with a moving cost of 30c per mile?

Others are doing this with a Strayer Portable which is a self-loading, batching and mixing plant, towed by truck from one job to another on its own wheels.

Capacity up to 30 yards per hour with one operator and cement handler. Concrete made to any specifications.

ERIE STEEL CONSTRUCTION COMPANY

BOX 1031-P **ERIE, PA.**

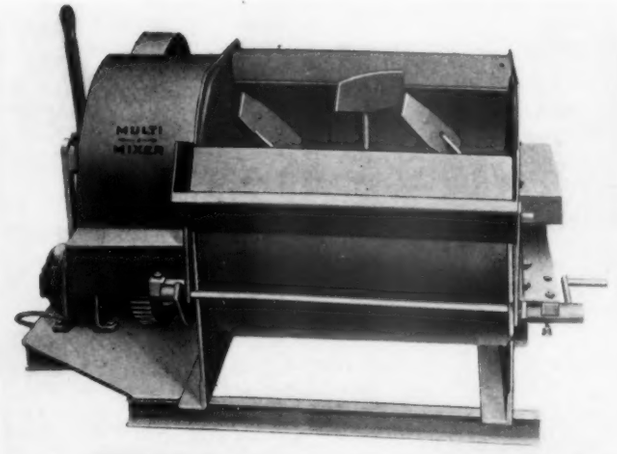
Multiplex

A Good Line to **BETTER PROFITS** in Concrete Blocks

NEW DESIGN MULTI-MIXER

TAMPERS

HAND PRESS MACHINES



POWER PRESSES

VARIABLE SPEED VIBRATION MACHINES

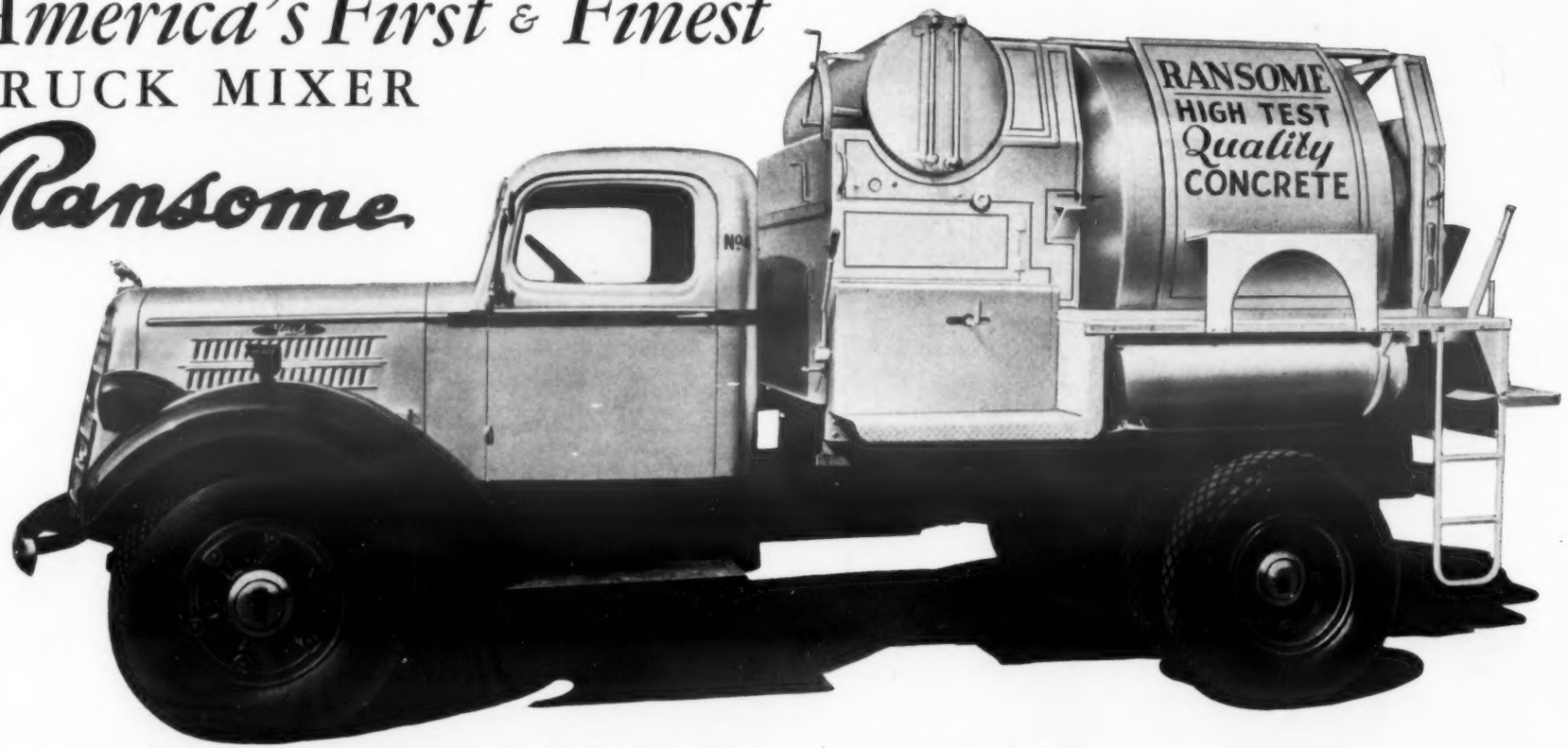
Time-tested Equipment

Here's the "Ace of Mixers," designed throughout to combine *high speed* concrete mixing with record low cost production. Reverse paddle action mixes any kind of aggregate twice as fast with less liner friction. Minimum power and maintenance requirements. Can be had in gear drive, belt or V-belt drive either end or side discharge. Six sizes.

Write for Catalog

The *Multiplex* CONCRETE MACHINERY CO., ELMORE, OHIO

America's First & Finest
TRUCK MIXER
Ransome



So Excellent in Performance That They Sell by Fleets

Send for Latest Bulletin and Specifications

RANSOME CONCRETE MACHINERY COMPANY
DUNELLEN NEW JERSEY

The CONCRETE MANUFACTURER

YES SIR!!

A CHEAPER WAY OF

PRODUCING CONCRETE BRICK

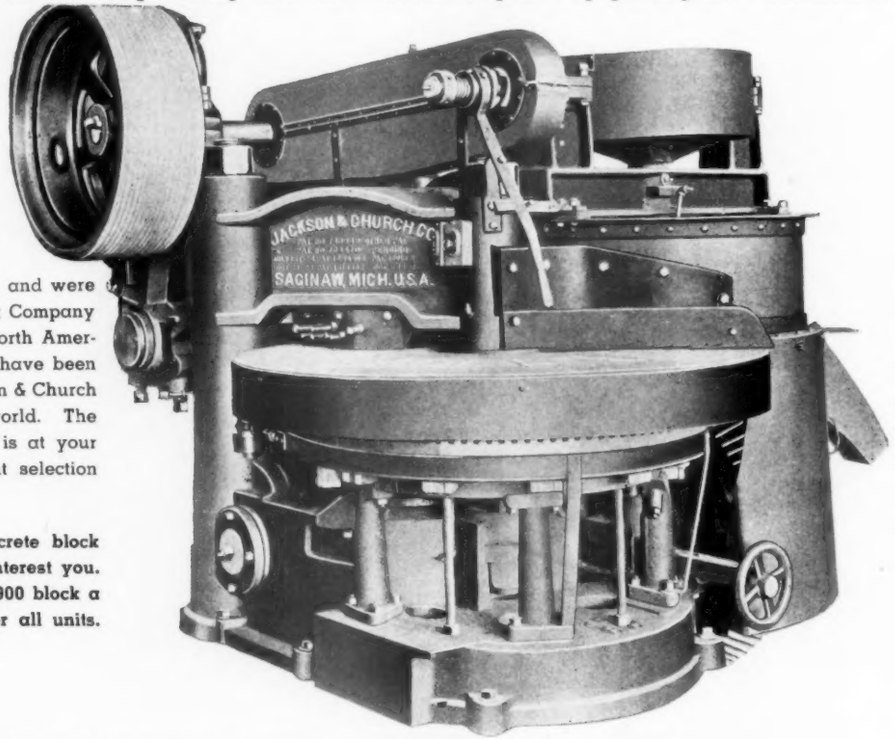
LEANER MIXES — HIGHER STRENGTHS
LOWER ABSORPTION — NO PALLETS NEEDED

A process and equipment that has been used for over thirty years in the manufacture of sand lime and concrete brick. The JACKSON & CHURCH brick machines will enable you to produce concrete brick at a cost that will give you a good profit in today's highly competitive markets. Well built, low maintenance cost, high production and simple to operate. Positively NO PALLETS are used as the brick are taken right from the machine and stacked on to each other on to flat deck cars or racks. They may be cured the same as concrete block, with low pressure steam or moist cured by air. All brick are accurate in size, of smooth texture with clean sharp edges. Cinder, Haydite, Waylite, Superock, Pottsco and other light-weight aggregate brick can be made on these machines.

Colored Concrete Face Brick can be made by adding the color to the mix or the brick may be sprayed after they are made. A large market is opening up in the low cost home field for this type of product. Why not tap this new source of profit by putting in a Jackson & Church Brick Machine in your plant. Write today for full information.

Jackson & Church Company are one of the oldest Brick Machinery manufacturers in the United States, in fact the Sand Lime Brick industry was introduced in this country by this company. Brick machinery and high pressure steam curing equipment were built as far back as 1901, and were installed in the plant of the Saginaw Brick Company in Saginaw, Michigan; the first plant in North America, and from that time on improvements have been made and carried out, so that today Jackson & Church equipment will be found all over the world. The engineering department of this company is at your disposal to assist you in your equipment selection and plant layout.

The VIBR-RITE plain Pallet Stripper concrete block machine made by this company should interest you. A small machine that will produce up to 900 block a day using plain wood or steel pallets for all units. Write for folder today.



Model-"A" Brick machine will produce from 3000 to 3500 bricks an hour
Model-"C" Brick machine will produce from 1500 to 1800 bricks an hour

JACKSON & CHURCH CO.
SAGINAW, MICH.

AGAIN... THROUGH 1940

Tisco

ON ALL SPECIFICATIONS

FOR WEARING PARTS!

BUCKETS • DIPPERS • DIPPER TEETH • CUTTER HEADS • RACK AND PINIONS • PUMP PARTS • CONVEYOR CHAIN • JAW PLATES • CHEEK PLATES • MANTLES • CONCAVES • SCREEN CLOTH • WELDING ROD • GRINDING BALLS • HARD SURFACING ROD, ETC.

Resolve, now, to include in all specifications for 1940, wearing parts of TISCO Manganese Steel. For no other steel provides the uniformly long and low-cost service which TISCO affords. For no other steel is TISCO made . . . with uniformly correct manganese content, and exacting control in every manufacturing and heat treating process. Be sure you get all the benefits of this tough, long-wearing steel in '40, by making sure all wearing parts are TISCO made.

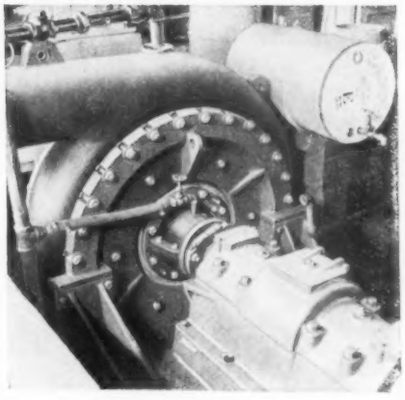
AT THE TW SHOW!

NATIONAL CRUSHED STONE CONVENTION
NATIONAL SAND AND GRAVEL CONVENTION
BE SURE TO DROP IN AT THE TISCO BOOTH AT EITHER SHOW!

TAYLOR-WHARTON
IRON AND STEEL COMPANY
HIGH BRIDGE, NEW JERSEY
PLANTS AT HIGH BRIDGE, N. J.—EASTON, PA.
BOSTON • CHICAGO • CLEVELAND • HOUSTON • NEW YORK
PHILADELPHIA • PITTSBURGH • SAN FRANCISCO • SCRANTON

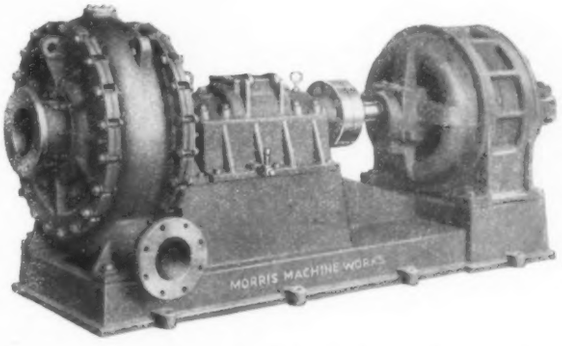
The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



What the mechanics told the boss

When we unexpectedly received a duplicate order from a large dredging company for a Morris Sand Pump, one of our representatives went to investigate. The reason for the re-order—the mechanics who operated the dredge told the owner that the first Morris Pump cost considerably less to run and they liked it far better than any other make they ever had. The features of design of Morris sand, gravel and dredging pumps that win enthusiastic opinion from operators and owners alike are described in bulletins which will be sent on request.

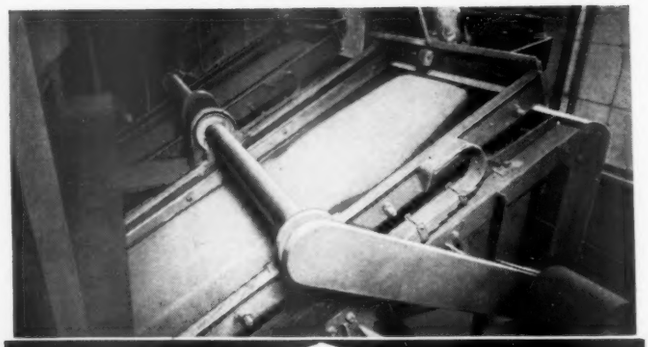


Pumps for the hard-to-handle services

For 75 years Morris has specialized in designing pumps to meet difficult requirements. Do your pumping conditions involve abrasive, sticky or pulpy materials—high temperatures, pressures, or suction lifts —multiple operating conditions—corrosive liquids? If so, investigate Morris—the largest line of pumps for special purposes.

MEMBER

For authoritative recommendations on any pumping or dredging problem, write Morris Machine Works, Baldwinsville, N. Y. Export Office: 30 Church St., New York, N. Y.



PROVED
on All Kinds of Screening Jobs!

• Link-Belt offers two general types of vibrating screens: (1) The "UP" unbalanced-pulley type for close sizing over comparatively small openings; (2) The "PD" positive drive type for larger screen openings and general heavy-duty service; both furnished in a range of sizes, single or double deck, with or without enclosures.

Consult Link-Belt engineers. Their recommendations are based upon years of experience in laboratory analysis and on all kinds of screening jobs.

LINK-BELT COMPANY, Philadelphia, Chicago, Indianapolis, Atlanta, San Francisco, Toronto, Offices in Principal Cities. 7891-B

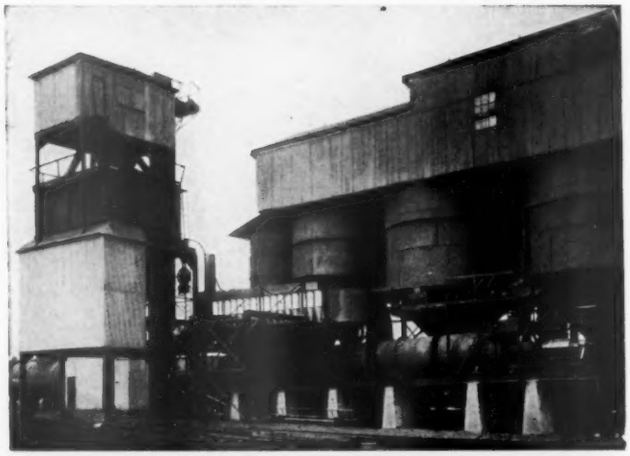
LINK-BELT *Vibrating* SCREENS

PIPE WORRIES END with NAYLOR

For carefree pressure lines, use Naylor Light Weight Pipe instead of costlier heavy pipe and save money. Naylor's exclusive Lockseam Spiralweld gives you pipe that is light in weight yet ideal for pressure lines because it is leak-tight, flexible, stronger and safer than ordinary light weight pipe. Sizes from 4" to 30" in diameter with all type fittings and connections. Complete fabrication service to meet any requirement. Write for Catalog No. 37 and see how you can end your pipe worries and save money besides.

NAYLOR PIPE COMPANY
1257 EAST NINETY-SECOND STREET
CHICAGO, ILLINOIS

NAYLOR LOCKSEAM SPIRALWELD **PIPE**

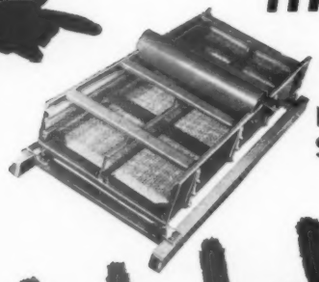


WARREN ASPHALT PLANTS
HOT MIX —— COLD MIX
—— OR ——
COMBINATION UNIT FOR BOTH TYPES

CAPACITY DESIGN AND ARRANGEMENT TO MEET ANY REQUIREMENTS

Designed and Built
—— By ——
WARREN BROTHERS ROADS CO.
P. O. BOX 1869
Boston Massachusetts

Holy Cats! Dat Screen mus' hab 9 lives!



Universal
Vibrating
Tough-Built
SCREEN

NINE
SIZES

Say why don't you
write for our CAT-A-LOG?

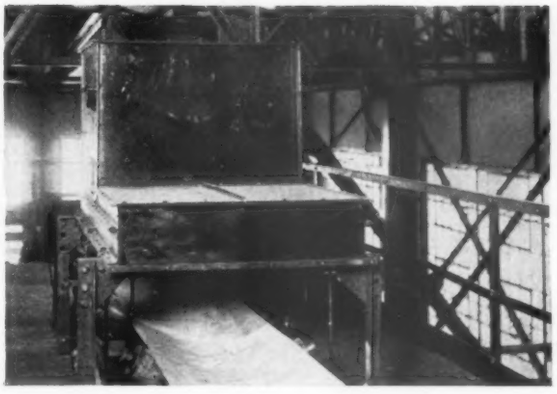
IS it any wonder that wise screen users demand the UNIVERSAL when they know that its rugged durability is a guarantee of record low operating and maintenance costs?

With its amazing stamina goes the most simplified precision-construction that you ever saw. No fancy gadgets nor complicated parts to get out of order. Just 100% SCREEN backed by 20 years experience and service. High speed vibration, maximum capacity and no blinding.

The price is right, too—and the UNIVERSAL challenges any screen on the market for VALUE and SERVICE LIFE.

UNIVERSAL VIBRATING SCREEN COMPANY

RACINE—WISCONSIN



It's the WEIGHTOMETER

for Automatic, Continuous Weighing

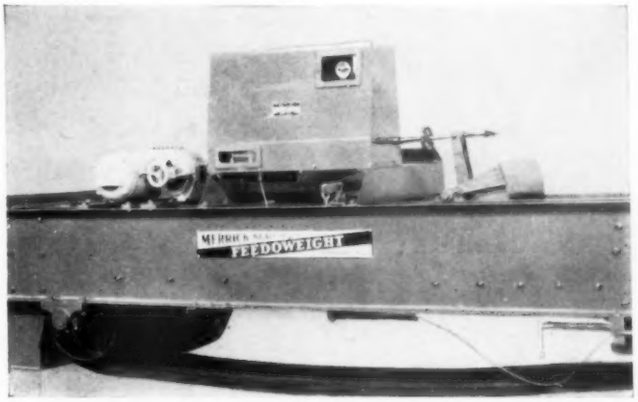
If you're handling bulk materials on a belt conveyor, a MERRICK Weightometer will provide an accurate and constant record of weights in transit.

Thousands of installations have demonstrated the reliability and economy of this equipment. Wherever crushed stone, ores or any materials are moved by belt, this unit is recommended to the discerning operator who demands at all times a positive and precise check on production. Weightometer is applicable to both inclined and horizontal conveyors.

And the FEEDOWEIGHT

for Accurately Feeding by Weight

This dual purpose machine is a conveyor type feeder and scale which automatically weighs, registers and uniformly feeds material by weight. Accurate operation assured by a power operated feed and control gate. Correctly proportions two or more materials, and is perfectly adapted for definite batch as well as continuous proportioning.



Write for Information

MERRICK SCALE MFG. CO., PASSAIC, N. J.

FLINK Self Feeding LIME SPREADER

•NO SHOVELER •NO FEEDER
•NO HELPER REQUIRED

"FED AND SPREAD FROM THE CAB!"

You load up your Flink-equipped dump truck at car or quarry—drive to the field to be treated and spread lime—no extra handling. One man, driving the truck operates spreader from the cab. Spreads sand, cinders, screenings. Spreader swings on regular end gate hinges.

Write for Prices and Further Details

FLINK IMPLEMENT CO., Streator, Illinois

BITUMINIZED AGGREGATE

P-A TYPE PORTABLE PLANT

MODERN STATIONARY AND PORTABLE MIXING PLANTS OFFER A NEW OUTLET FOR AGGREGATE PRODUCERS

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HETHERINGTON & BERNER INC.
ENGINEERS AND MANUFACTURERS
701-745 KENTUCKY AVENUE • INDIANAPOLIS, INDIANA

SAUERMAN LONG RANGE MACHINES

For Digging, Conveying, Stockpiling

Sauerman Cableway lifts gravel from deep under water to top of plant.

Scraper digs 100 tons per hour from hill.

Producers of mineral aggregates in all parts of the world testify to their satisfaction with Sauerman Scrapers and Slackline Cableways for problems of digging, conveying and stockpiling.

The first cost of a Sauerman machine is reasonable, operation is an easy one-man job, maintenance expense is small. As a result, materials are handled at amazingly low costs.

Write for 84-page catalog

SAUERMAN BROS., INC.
434 S. Clinton St., Chicago

Here is how one producer uses a simple setup of a Sauerman Scraper to cut the cost of storing and reclaiming aggregate.

Enjoy Real Haulage Economy

with

DAVENPORT INDUSTRIAL LOCOMOTIVES

Your most vital concern in connection with the locomotives you rely upon is ECONOMY. Real economy demands not only efficient performance but the continuous performance which arises out of sturdy dependability year after year.

Davenport Industrial Locomotives have proven their worth on every continent and every type of haulage assignment for over forty years.

As you contemplate new locomotives we urge your careful consideration of Davenports. Tell us what your requirements are and Davenport engineers will gladly submit competent and reliable recommendations without the slightest obligation. DAVENPORT LOCOMOTIVE WORKS (a Division of Davenport Bessler Corporation), DAVENPORT, IOWA.

Write TODAY for Descriptive Catalog

PLANT AND MAIN OFFICE—DAVENPORT, IOWA
New York and Export Office—30 Church St.
Cable Address "Brosites"

DAVENPORT — Sold all over the World — INDUSTRIAL LOCOMOTIVES

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GASOLINE • DIESEL • STEAM
DIESEL ELECTRIC • GAS ELECTRIC

BETTER SCREENING LONGER LIFE...

Hendrick Perforated Plate for Vibrating Screens

For vibrating, revolving and shaking screens, there is no more efficient screening medium than Hendrick Perforated Plate. It is available in any size or shape of perforation, flat or double corrugated. Its full clearance prevents clogging and its uniform mesh is maintained for the life of the plate. Made of hard tempered steel it resists abrasion and has a long life that reduces screening costs. Write for complete information.

Elevator Buckets
All types — all sizes

Light and Heavy Steel Plate Construction
Hoppers — Chutes — Casings

HENDRICK MANUFACTURING CO.

39 Dundaff Street, Carbondale, Pa.

SALES OFFICES IN PRINCIPAL CITIES • PLEASE CONSULT TELEPHONE DIRECTORY

Makers of Mitco Open Steel Flooring, Hendrick Mitco Shur-Site Treads, Hendrick Mitco Armorgrids.

WILLIAMS *Buckets*

Announcing

The New 1940 Line of

WILLIAMS *Buckets*

featuring **WELDED**

ROLLED STEEL CONSTRUCTION

See these Improved Buckets and learn the broader guarantees behind them at

SPACE H-6 — 1940 ROAD SHOW

CHICAGO • JANUARY 29 — FEBRUARY 2

What Wellman did for the Steel Industry, they now do for the Construction Industry!

built by **THE WELLMAN ENGINEERING CO.**

CLEVELAND, OHIO

EITHER LARGE or SMALL CAPACITIES • • •

There are many sizes of Jeffrey pulverizers and crushers for handling either large or small capacities . . . with machines of medium weight for light work and extra heavily constructed units for heavy work.

The big Type "B" swing Hammer Pulverizer is shown below. It reduces through a series of distinct steps, the greater part of the reduction being done in the upper crushing chamber. Write for engineering data.

Reduction Division

THE JEFFREY MANUFACTURING COMPANY

917-99 North Fourth St.,
Columbus, Ohio

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Single Roll Crushers
Double Roll Crushers
Rotary Ring Crushers
Flextooth Crushers
Pulverizers
Shredders

A type and size to meet any requirement. Send for Catalog No. 710-B.

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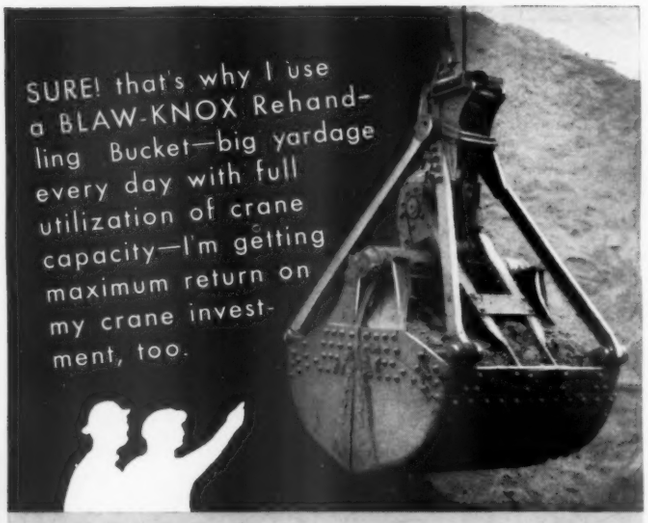
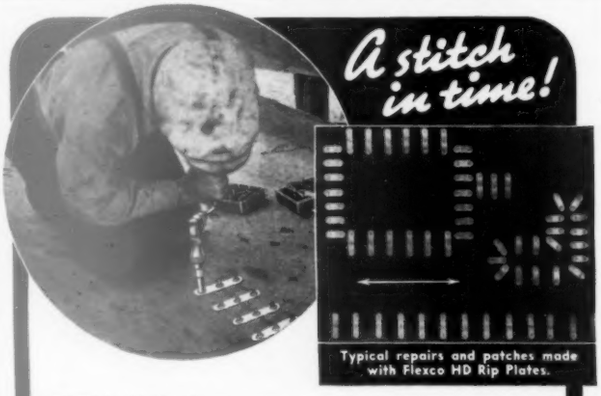

SURE! that's why I use a BLAW-KNOX Rehandling Bucket—big yardage every day with full utilization of crane capacity—I'm getting maximum return on my crane investment, too.

Bulletin 1606 entitled Blaw-Knox Buckets for Contractors shows how to select a bucket to secure the profitable difference between peak and ordinary performance—it will be sent on request.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PA.

BLAW-KNOX
REHANDLING BUCKETS



Typical repairs and patches made with Flexco HD Rip Plates.

THOUSANDS of men in industrial plants, mines and mills all over the country are doing just what this man is doing. They are cutting costs by repairing conveyor belts with Flexco HD Rip Plates.

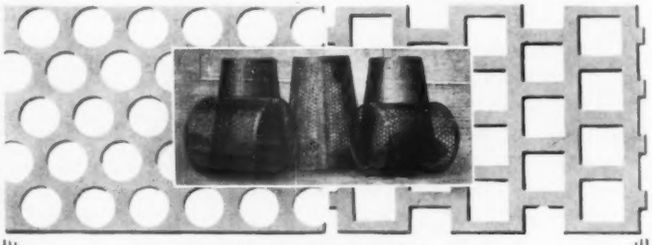
WRITE TODAY FOR FOLDER W R P that shows how easy it is to repair rips, to strengthen soft spots and to put in patches by using Flexco HD rip plates. The folder also shows how to make tight butt joints in both conveyor and elevator belts with Flexco HD Belt Fasteners. These fasteners are made in five sizes. Furnished in special analysis steel for general use and in various alloys to meet special conditions.

Flexco HD Rip Plate

Flexco HD Belt Fastener

FLEXIBLE STEEL LACING CO.
4623 Lexington St., Chicago, Ill.

FLEXCO HD BELT FASTENERS
REG. U.S. PAT. OFFICE
Sold by supply houses everywhere



CROSS
PERFORATED SCREEN PLATES AND SECTIONS
VIBRATING AND ROTARY

Better performing, longer wearing equipment is a big part of the answer to today's keener competition and tighter specifications.

Use Cross screens and check their performance. They will help you meet these problems. Check their bulldog wear and shovel capacity.

Write for details.

CROSS ENGINEERING COMPANY
Main Office & Mfg. Plant, Carbondale, Penna.
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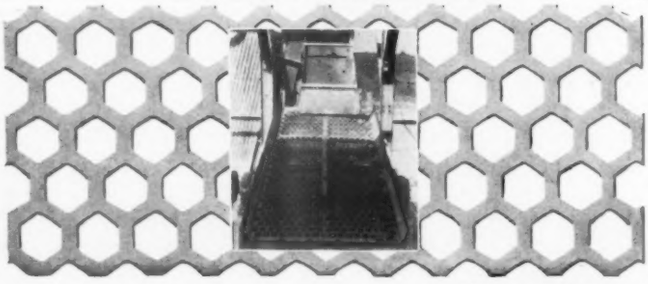
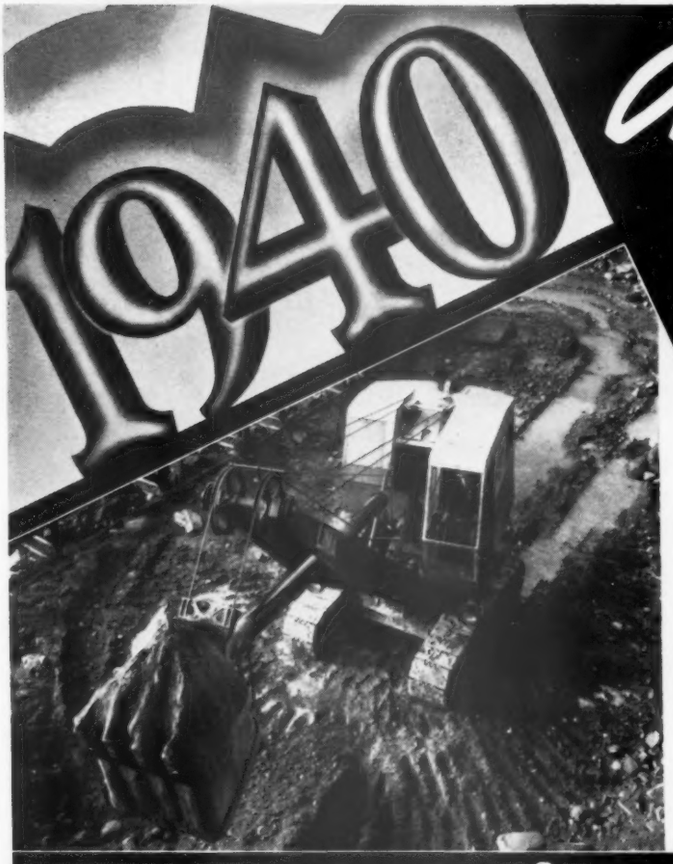


1940 Another LIMA Year



This year as in years past, **LIMA** shovels, draglines and cranes lead in design, economy and performance. They have been proved dependable and economical on many of the biggest jobs in the country. Whatever kind of material you have to move, you can be certain that **LIMA** will do the job in the least possible time with more profit for you.

LIMA LOCOMOTIVE WORKS, INCORPORATED
SHOVEL and CRANE DIVISION - - - LIMA, OHIO

Newark, N. J. New York, N. Y. Dallas, Texas Portland, Ore. Memphis, Tenn. Los Angeles, Calif.
San Francisco, Calif. Seattle, Wash. Philadelphia, Pa. Spokane, Wash. Montreal, Quebec, Canada Vancouver, B. C.

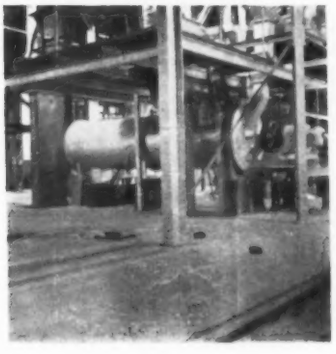
LIMAS ARE BUILT IN ¾ YARD CAPACITY and LARGER

KUNTZ SYSTEM LIME PLANTS

CUMMER LIME & MFG. CO., KENDRICK, FLA.

KUNTZ equipment makes this new $150,000 lime plant a standout operation. Output includes a complete line of cement products. Kiln capacity 40 tons per day.

HAWAIIAN GAS PRODUCTS CO.
HONOLULU



KUNTZ installed a standard combination-fired lime kiln in this plant, which supplies U. S. Army and Navy with oxygen and acetylene for welding. Also services Island refrigerator trade with liquid CO_2 and dry ice. Second KUNTZ kiln furnished in April, 1939.

OREGON LIME PRODUCTS CO.
WILLIAMS, ORE.

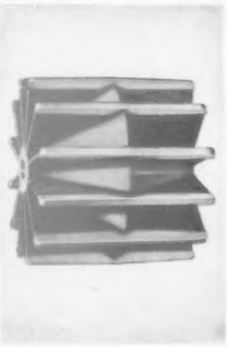
The KUNTZ System of lime manufacture has made major contributions to the efficient and profitable operations of producers throughout the industry.

The KUNTZ Automatic Continuous Lime Kiln is replacing the rotary type and vertical shaft type kilns which are more expensive to run and uncertain in quality of product.

The KUNTZ gravity system of lime hydration is the only process which permits the sale of hydrate line at raw lime prices.

Make KUNTZ engineers prove their claims to leadership—in your plant!

LIME & HYDRATES PLANTS CO. P. O. BOX 574 YORK, PA.



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THE LIFE OF CONVEYOR BELTS!

The most profitable investment in conveyor equipment! A pully that saves at least 50% on conveyor belts! This exclusive Sprout-Waldron development prevents material from coming between the face of the pulley and the belt . . . eliminates the heavy friction wear and punching of holes. Interchangeable with standard pulleys. *Write for list of sizes available.*

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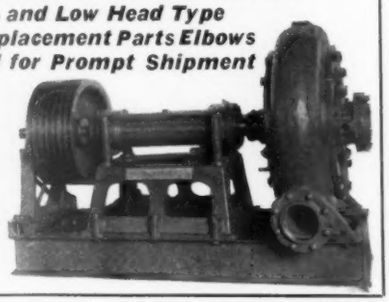
136 SHERMAN ST. MUNCY, PA.
ELEVATORS, CONVEYORS, POWER TRANSMISSION EQUIPMENT

LIGHTNING
Sand and Gravel Pumps
Heavy-Duty (Ball-Bearing) and Low Head Type
Complete stock of Replacement Parts Elbows and Fittings Carried for Prompt Shipment

High efficiency—low operating cost—precision workmanship—wear-resisting, non-heating bearings even when operated under extremely high heads. WRITE



KANSAS CITY HAY PRESS CO.
KANSAS CITY, MO.

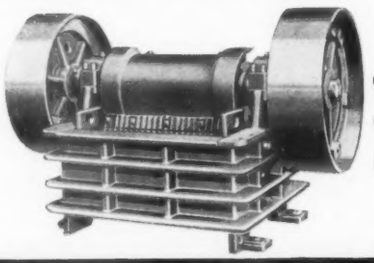
Lewistown Foundry Products
ARE
Performance-Tested

BUCKET ELEVATORS
REVOLVING SCREENS
CRUSHERS DRY PANS

Lewistown Foundry & Machine Co.
Lewistown, Pa.

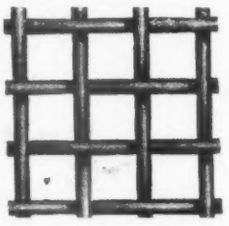
"I'm probably the youngest shovel operator that ever swung a dipper stick—but already PIT AND QUARRY is my favorite magazine."

ROAD SHOW Booth E-9



CRUSHERS SCREENS
PORTABLE PLANTS
CONVEYORS FEEDERS
ELEVATORS
LOADERS BINS
Write for Literature
See You at the Show

DIAMOND IRON WORKS INC.
AND THE MAHR MANUFACTURING CO. DIVISION
MINNEAPOLIS, MINNESOTA, U. S. A.



"TWIN CITY"
SCREENS
tell their own story on the job.

When they turn out more tonnage with less cost and trouble; when they give extra months of wear, they talk your language better than any words we could use.

"Twin City" screens will knuckle down to any job you give them. Try them the next time you need screens.

TWIN CITY IRON & WIRE CO.
Saint Paul Minnesota

Write for Catalog No. 39

REPAIR and REBUILD
WITH WELDING

This worn-out pinion was reclaimed by welding at 1/6 of replacement cost. Welding procedure on this kind of work is yours for the asking.

SMOOTHARC WELDING ELECTRODES

For rebuilding gears, sprockets, drill points and other quarrying equipment and machinery, Smootharc Welding Electrodes include all standard types as well as special types for hard surfacing, resistance to impact, etc. Ask us to send you Smootharc's "Helpful Welding Hints." Harnischfeger Corporation, 4451 W. National Ave., Milwaukee, Wis.

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TRUE MANGANESE STEEL

Screens

Highest abrasion resistance of any known steel. Double Lock Mesh Weave perpetuates initial accuracy for the life of the screen. Send for prices and performance facts.

MANGANESE STEEL FORGE CO., CASTOR AVE. & ALLEN ST., PHILA., PA.

INCREASES DUST FILTERING CAPACITY 86%
LOWERS OPERATING COSTS

At Cost of About $1000—by SLY *Modernization*

The Hawkeye Portland Cement Company of Des Moines, Iowa, had a Sly Dust Filter purchased in 1925 which was still going strong but greatly in need of rejuvenation.

Their old 15' long filter had a total of 58 cloth screens with a net effective cloth area of 3016 sq. ft. By installing modern Sly Dust Filter parts in their old dust arrester case, they achieved an effective cloth area of 5610 sq. ft. or 86% more cloth than the old. With this increase in cloth filtering area, the ratio of air to cloth remains very low, resulting in less air resistance and greater power economy. The new, positive and vigorous bag shaking mechanism furnished also contributes greatly to the operating efficiency of this unit.

The installation complete with all necessary bags, shaking device parts and drive including a gear-head motor, cost little more than $1000.

Modernization accomplishes so much and costs so little that you really cannot afford to operate an old filter. May we estimate your needs and tell you what can be accomplished?

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4745 TRAIN AVENUE — *Branch Offices in Principal Cities* — CLEVELAND, OHIO

Crush "One Man" Size Rock to 1¼"—¾" or Agricultural Limestone in One Operation . . .

CUTAWAY VIEW of "Slugger" showing heavy duty hammers, liners and discs.

The WILLIAMS "SLUGGER" CRUSHER AND PULVERIZER

Reduces large rock to 1¼", ¾" or agricultural size in one operation, thus enabling operators to produce these sizes with small investment.

Features include—Manganese Steel Hammers, Heavy Duty Bearings, Adjustable Breaker Plate, Hammer Adjustments Overcome Wear, Economical to Operate—Seven Sizes.

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70 mesh to 325 mesh
The Williams Roller Mill with Air Separator . . . Built in Nine Sizes

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OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
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PATENT CRUSHERS GRINDERS SHREDDERS

EQUIPMENT FOR SALE CHEAP

1—Vulcan 40 ton Std. Ga. Saddle tank locomotive.
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2—Whitcomb 12 Ton 36″ Gauge Locomotives.
2—C. P. Compressors, 590 cu. ft., 100 h.p. motor.
2—Worthington Compressors, 621 cu. ft., 75 h.p. mtr.
1—Allis-Chalmers 75 Caterpillar with Bulldozer.
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1—Ingersoll-Rand pavement breaker.
6—Easton 4 yd. all steel 36″ Ga. cars.
4000′ of 9″ x 9″ road forms.
1—Ransome 27 E Paver.
2—No. 116 Chicago Pneumatic Paving Breakers.
2—1 yd. Insley bottom dump concrete buckets.
1—Schramm No. 120 Compressor.
1—1 yd. Owen Bucket.
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1—¾ yd. Browning clamshell bucket.
1—¾ yd. Blaw-Knox bucket.
1—Le Courtney 6″ Cent. Pump. 40 h.p. motors.
1—Morris 8″ dredge pump, 150 h.p. G.E. motor.
1—Morris 10″ cent. pump, 2250 GPM at 130′ head.
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1—Thompson 6″ self-priming pump, Waukesha motor.
2—Gardner Denver Sheeting Hammers.
2—Humdinger 6″ self-priming pumps, gas motor.
1—Humdinger 4″ self-priming pump.
1—Humdinger 2″ self-priming pump.
1—Domestic double diaphragm pump, gas motor.
1—G.E. motor, 200 h.p., slipring.
2—No. 9 B 2 McKiernan-Terry Hammers.
3—No. 5 McKiernan-Terry Hammers.
3—No. 7 McKiernan-Terry Hammers.

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LORAIN 75-A 1¼ yd. Shovel No. 3929.
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P&H Mod. 400 ¾ yd. Shovel No. 3953. Rebuilt.
Universal Truck Crane; 6½ Ton Pneumatic Tires.

SPECIALS

2—Chicago-Pneumatic 15x9x10 Compressors direct con. Benz 40D, 120 HP Diesel Eng., 664′ ea. Like New, comp. with all accessories and ready to work.
Ingersoll-Rand Mod. 420 Portable. Actual Capy. 413′ @ 100#. Used less than SIX MONTHS. New Guarantee. Bargain.

Whitcomb 4 Ton Gas Loco., 24″ Ga. Like New. $395.00.
2—Whitcomb 6 Ton Gas. Loco., 24″. Good. $350.00 ea.
2—Owen ¼ Type M Clam Shell. Almost New.
30—C.P. No. 5 DRIFTERS comp. with Shells and Screws. $125.00 ea.

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Widener Building — Philadelphia, Pa.

FOR SALE
By Owner

Sacrifice to settle Estate. Greely Quarry, at Russellville, Kentucky. Inexhaustible supply of hard, high-grade calcium carbonate Grade A stone. 30 foot face above crusher floor. Dump direct to large Primary. No Water. No Incline. 50 acres practically free of any overburden. Present plant and equipment consisting of No. 9 Primary, 1½ yard shovel, 25 ton crane, compressor, conveyors, elevators, cars, 14-car concrete tipple, unlimited ground storage. Cheap power, either electric or steam, affords most economical production of crushed, building, chemical and Riprap stone, agricultural lime and chemical lime of any quarry in Southern and Western Kentucky. Unlimited sales possibilities throughout greater part of all Western Tennessee as well as Western Kentucky.

Send inquiries to
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PIT AND QUARRY PUBLICATIONS
538 S. Clark St. — Chicago, Ill.

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Freight Cars; any kind
Locomotives; all types
Relaying Rails
Freight Car Repair Parts
Perhaps **we** can supply
your requirements, and **immediately?**

OTHER MACHINERY
and EQUIPMENT, TOO!

IRON & STEEL PRODUCTS, Inc.
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"Anything containing IRON or STEEL"

FOR SALE

SHOVEL—Steam, Marion 100 on Caterpillars; 3½ cu. yd. Dipper excellent condition.

LOCOMOTIVE — Steam, American 40 ton, four wheel, saddle tank, overhauled.

CRANE—Steam, Ohio 20 ton capacity, double drum, bucket operating, 50′ boom, rebuilt.

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2—Ingersoll-Rand X.B. Imperial Type 10 2 Stage Air Compressors. Complete with motors and air receivers.
1—446 C.F.M. 80 H.P. G.E. Motor.
1—327 C.F.M. 60 H.P. G.E. Motor

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FOR SALE

2—Link-Belt dewatering elevators, 36′ centers, complete with all steel supporting structure and drive machinery.
2—Strut bar, revolving, scalping screens, 48″ diameter, 12′ long, with drive machinery.
1—Sauerman, 2 cu. yd. capacity, slackline, electric hoist with 150 H.P. motor and starting equipment.

TERRE HAUTE GRAVEL COMPANY
Terre Haute, Indiana

PIONEER 300-W portable wheel type sand & gravel crushing, screening & washing plant. 3 sizes material, cap. 900 yds. day, complete, gas motors, pump, piping; A-1, reduced price.
BARBER-GREENE #42 bucket loader, $575.
DIESELS, Bessemer & F-M, 60-150-180-420-HP.
Locomotive cranes, Brownhoist, Orton, & Link-Belt, 15 to 30 tons, steam and gas.
FAIRBANKS-MORSE 360 HP diesel eng.-generator set, 3/60/480 volts, A-1, only used 2 yrs.
PLYMOUTH gas locomotives, 8 & 10 tons, 36″ ga.
ORTON ¾ yd. gas cat. crane, 35′ bm., bkt., wt. 26 tons, wkg. cond., $1750.

H. Y. SMITH CO. — 821 N. B'WAY. — MILWAUKEE WIS.

FOR SALE

One steel boat 34x20, together with one ten inch Ansco pump; motor, drum control, grids, oil circuit breaker. Boat is in sections and can be trucked any place. All of the above in excellent condition. Very cheap. Address
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3—75 H.P. Vertical Motors at Manitowoc, Wisconsin, and 3 at Toledo, Ohio. If interested, communicate with

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FOR SALE

1—10″ steel portable hull Electric Dredge.
1—15″ steel portable hull Swintex Ladder.

H. P. GUION
303 42nd St. — New York, N. Y.

SAVE

Bolted type steel bins will cost you less erected than ordinary wood bins.

New and Used Pipe and Tubing

Jos. Greenspon's Son Pipe Corp.
Natl. Stock Yds. (St. Clair Co.) Ill.

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1—Williams No. 6 Jumbo Hammer Mill, excellent condition.
1—Orton Crane, 15 ton cap., 55′ boom, gas crawler, 1¼ yd.
1—Northwest Crane and Dragline, 1¼ yd., 50′ boom, rebuilt.
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1—Kiesler Clamshell Bucket, 1¼ yd.

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Rock crushing plant located at edge of Bakersfield City limits in the heart of California oil fields. Deposit sufficient to operate from 15 to 18 years always showing a profit. Sales for 1938 were approximately 100,000 tons of materials.

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SCRUBBER SCREEN
FOR SALE

30 Foot by 60 Inch
Traylor.

Complete for Belt Drive.

In Good Condition

SOUTHERN MATERIALS CORP.
Norfolk — Virginia

Cranes—Drags: Gas & Diesel, full rev., ⅜ & ½ yd.
Port. Crush. Plants — 9x36 — 9x24 inc. rolls—8x24—9x20—9x16.
Crushers — 48x60 — 24x48 — 24x36—18x24—15x30—12x24—9x16—8x12.
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Barber-Greene Loaders—Nos. 21 & 42. Also Haiss.
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30′ Coal Conveyor, crawler type, gas or electric.
Loco. Cranes—Gas & steam, 7½ to 40 tons cap.
Diesel-Gen. & Motors, 125 KW., 250 volts DC.
Buckets—Msc. Clam., Drag., & Scraper, ¼-6 yd.

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DEPENDABLE MACHINE for rent or sale

⅝ yd. truck crane; 25′ lattice boom; Waukesha engine; Mack 7½ ton truck; dual pn. tires.
Caterpillar 30 with bulldozer, overhauled.
Haiss bucket loader; excellent condition.
Rebuilt tractor shovels; all prices.
Shovel front for No. 3 Northwest crane.
Several 30′ portable belt conveyors.

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Branch: 2272 S. 7th St., Springfield, Ill.

WANTED

1—2′x4′ Double deck vibrating screen

ANDERSEN SAND & GRAVEL COMPANY
SAGINAW, MICHIGAN

Jaw, Roll and Cone Crushers, all sizes.
8A, 10B, 32B & 40B Telsmith, 19 & 49 Kennedy.
No. 3, 4, 6 TZ Traylor Gyratory Crushers.
Swintex Cutters 25′, 8″-50′, 10″-45′, 15″ pipe.
6, 8, 10 & 12″ Sand & Gravel Pumps, other centrifugals.
Conveyor Equipment 14″-36″, belt and Portable.
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Vibrating and Rotary Screens, all types and sizes.
2-18 ton, 2-21 ton Davenport 36″ ga. Locos.
Gasoline Locos—all weights and gauges. Dump Cars.
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185 HP Venn Severin 3 cyl. Diesel Rebuilt.

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WANTED

To Buy

Used McLanahan & Stone Corporation single roll crushers in Pioneer or Steelstrut types. Will buy any size.
Send replies to
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1—24x36″ Farrell, B-15—new jaws. Used one month after complete rebuilding.
2—8x36″ Universal, reduction type. Can be set to ¾″.
1—42x48″ Traylor Bull-dog.
1—18x30″ Allis-Chalmers.

GYRATORY FINE REDUCTION CRUSHERS

2—2′ Symons Cones, fine bowls.
2—No. 2F Telsmith, 32″ dia. heads—to ⅝″.
1—No. 37 Kennedy Gearless, with spare shaft.
1—4′ Traylor, Type No. 410-TZ.
1—3′ Traylor, Type TZ.
1—No. 25 Kennedy, vertical, motor driven.
1—8″ Traylor with bell head and non-choking concaves.
1—10″ Newhouse, with 100 H.P. motor.

CRUSHING ROLLS

7—Sets of 24″ dia. x 14″ Allis-Chalmers.
1—Set of 20″x14″ Sturtevant, balanced type.
1—Set of 36″x16″ Sturtevant.
1—Set of 26″x14″ Allis-Chalmers.

VIBRATING SCREENS

18—Tyler Hummers; 12—3′x5′, 4—4′x5′, all double deck; 3x5′ triple deck; 4x5′ triple deck. All of the steel enclosed type, with V-16 vibrators.
1—Tyler Rotap Testing Screen, motor driven.
5—Motor Generator Sets for operating Tyler Screens; 1 KW, 1½ KW., 2 KW, 6 KW.
2—3′x5′ Leahy single and double deck.
5—4′x7′ Leahy, double deck, motor driven.
1—3′x6′ Sturtevant M-V, double deck.
1—4′x8′ Symons, 3-deck.
3—5′x10′ Symons, 3-deck, motor driven.
2—4′x7′ Traylor, 2-deck.

BELT CONVEYORS

3—16″ 35′, 85′, 160′ c/c.
1—18″ 100′ c/c.
3—24″ 80′, 160′, 240′ c/c.

All of these conveyors are equipped with Rex-Stearns anti-friction ball bearing troughing and return idlers. The 80′ conveyor has a magnetic head pulley.

RAYMOND PULVERIZERS

3—No. 60 "Imp" type, each with air separator and direct connected 60 H.P., 3/60/440 volt, 1750 R.P.M. motor, also feeder motor.
2—3-roll and 5-roll, High Side type, for fine separation.
3—4-roll and 5-roll, Low Side type.
8—Beater types; No. 0000, 00, 0, 1 and 3.
2—No. 0000, with direct connected 10 H.P. motors.

HARDINGE CONICAL BALL MILLS

1—3′x8″ iron lined, worm gears, silent chain drive.
2—4½′x16″, iron and silex lined.
1—5′x22″, iron lined.
2—6′x22″, iron and silex lined.
1—7′x22″ Hardinge Conical Ball Mill, titanite lined, 28″ trunnions.
6—8′x72″, 12″ herringbone gears, 20″ trunnions, steel shells, steel heads, scoop feeders, railroad rail liners.
3—8′x18″, 8″ herr. gears, railroad rail liners.
5—8′x30″, steel shells, 10″ herr. gears, arranged for direct motor drive through flexible coupling; iron lined.
2—8′x30″, same as above, but silex lined.
1—6′x30″, silex lined, 8″ herr. gears, 13″ trunnions.

INDIRECT HEAT ROTARY DRYERS

3—4′x35′, 70″x40′, 80″x65′, all type BV, made by L. R. Christie Co., Pittsburgh.

Refer to full page ad November issue for listings of several plants we are now liquidating, or write for detailed circular.

Write for detailed illustrated circulars

CONSOLIDATED PRODUCTS CO., INC.

17-19 PARK ROW — **NEW YORK, N. Y.**

Our shops at Newark, N. J., cover eight acres

CRUSHERS—ELEVATORS—SCREENS SAND WASHERS—PUMPS CONVEYORS

1—7½″x13″ CHAMPION No. 3 Jaw Crusher.
3—BRAND NEW Jaw Crushers 9″x15″ and 10″x20″.
1—9″x16″ CLIMAX No. 2 Jaw Crusher.
1—12″x26″ CHAMPION No. 6 Jaw Crusher.
1—No. 19 KENNEDY Fine Reduction Crusher.
1—No. 1 STURTEVANT Ring Roll Mill.
1—Pr. 24″x14″ WEBB CITY Crushing Rolls.
1—48″ dia. x 18′ Allis-Chalmers trunnion mounted Screen with steel frame.
2—M-20 QUAKER CITY Hammer Mills.
1—No. 2 MEAD Disc Mill.

JOHNSON AND HOEHLER, INC.

Lansdowne, Penna.

MARBLE–DOLOMITE

Dolomite: One of the largest deposits of pure white and colored dolomite in this country and on the Pacific Coast. Several thousand acres. Proven quantity. Grade established. Produces various standard products including many colored terrazzo and art stone aggregates and high grade marbles. Operating successfully for years. All facilities and utilities in. Equipped. Operating lease about to expire. Any similar or related industry with an eye to future reserves or present sources of supply, or responsible individual desirous of acquiring a substantial and potentially profitable property and business should communicate with me directly or through their disclosed representative. All negotiations must be positively confidential. An unusual situation and opportunity. Write or call on

ARTHUR J. HUGHES, ATTORNEY AT LAW
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Butler batching plant, 5 compts, cap. 105 yds. aggregate, 200 bbl. cement, weighing devices, elevator, conveyors, complete.
225 bbl. Erie bulk cement plant, complete.
155 bbl. Fuller cement bin, electric batcher.
Blaw-Knox 270 bbls. bulk cement plant, complete.
72 ton Blaw-Knox steel bin, portable, 2 compts.
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Jaw: 6x12, 9x16, 10x20, 12x26, 13x30, 18x36, 24x36.
Jeffrey type A 30″x24″ pulverizer.
Robins apron feeder, 18″x6′, 24″x6′.
Traylor apron feeder, 5′x15′.
Bucket elevator, 47′, belt, buckets 24″x9″x11″.
Bucket elevator, 32′ chain, buckets 8″x6″x12″.
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Robins 4x8 double deck Gyrex vib. screen.
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41-B Bucyrus-Erie comb. crane and shovel. Steam.
50-B Bucyrus-Erie steam shovel.
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Universal 7½ ton truck crane, Mack truck pneumatics.
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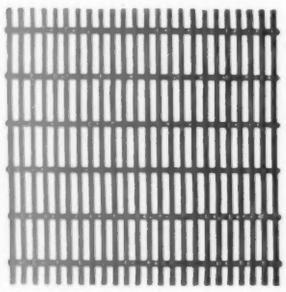

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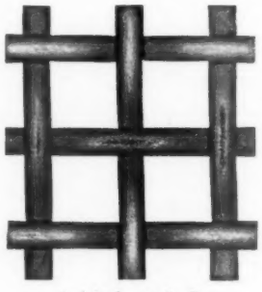

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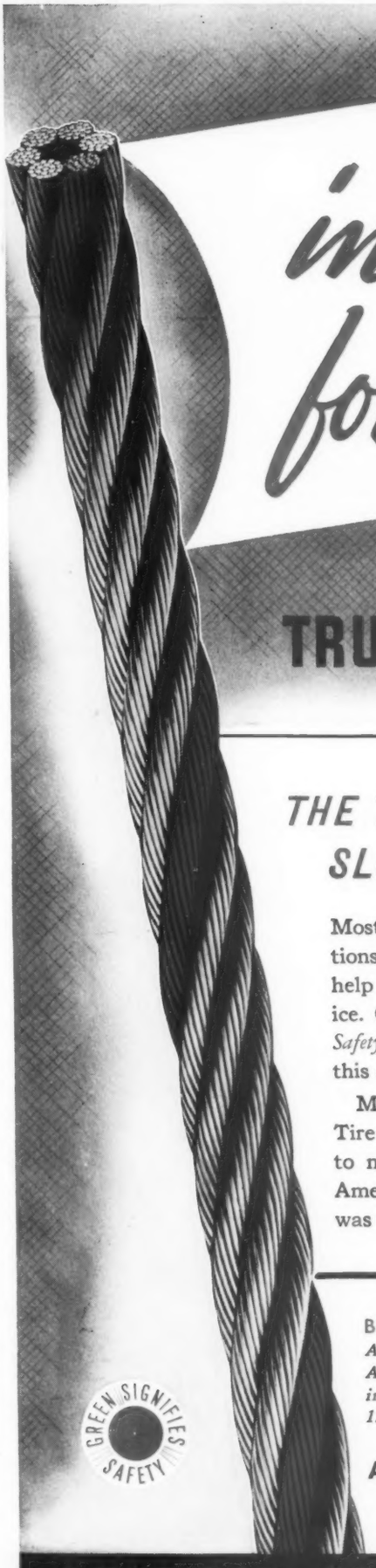

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for Economically Removing

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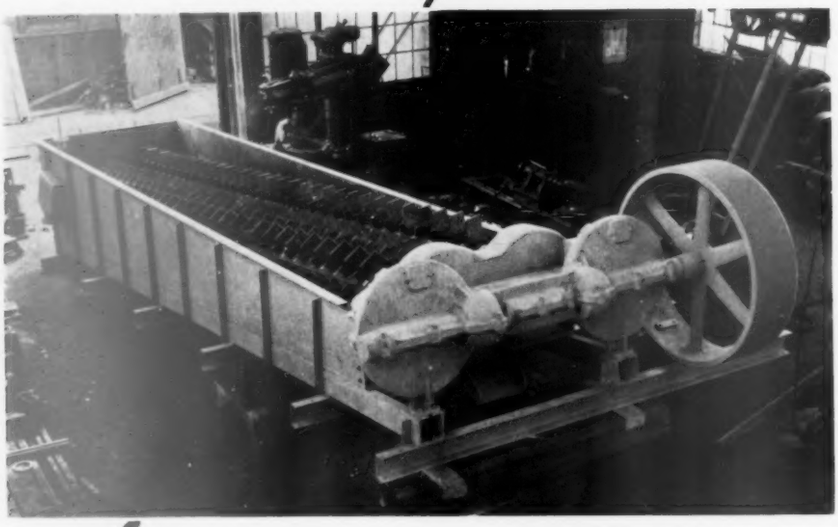
These modern Log Washers offer you the cheapest and quickest methods of removal for Tough Clay or Soft Rock.



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Giant All Steel Sledge-Wedge Roll Crusher is built to handle very hard materials on the lowest cost basis. Triple-action crushing adds the splitting effect of wedges to the impact and squeeze of ordinary crushers. Capacities upward of 500 tons per hour.

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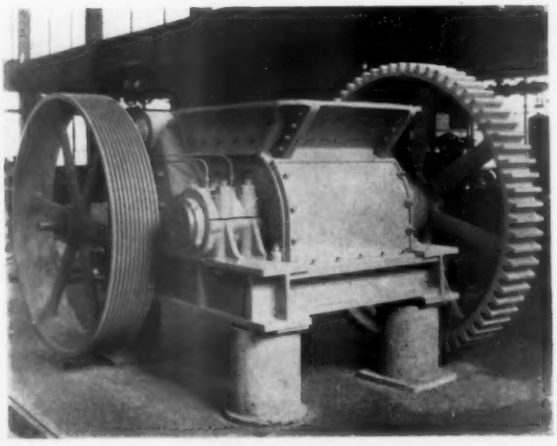

McLANAHAN & STONE CORPORATION

Originators of Single Roll Crushers and Steel Log Washers

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